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GREENBRIER

WILD & SCENIC RIVER STUDY

DRAFT ENVIRONMENTAL IMPACT STATEMENT AND STUDY REPORT



FOREST SERVICE
MONONGAHELA NATIONAL FOREST
ELKINS, W. VA. 26241

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DRAFT ENVIRONMENTAL IMPACT STATEMENT

Greenbrier Wild and Scenic River Study
Pocahontas, Greenbrier, Monroe and
Summers Counties, West Virginia

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Abstract: Five alternatives regarding the addition of the Greenbrier River to the National Wild and Scenic Rivers System are described and evaluated. The alternatives are: (1) continuation of present management direction, no Wild and Scenic Rivers System designation; (2) full designation of all eligible segments from the headwaters to the mouth, a total of 199 miles, under Federal management; (3) designation of all eligible segments, excluding thirteen miles for a proposed dry reservoir, a total of 186 miles, under Federal management; (4) designation of all eligible segments from the headwaters to Anthony, a total of 133 miles, under Federal management; and (5) inclusion of segments specified in Alternative 4 to the Wild and Scenic Rivers System, but through State request for designation, and management by the State or political subdivision of the State in accordance with Section 2(a) (ii) of the Wild and Scenic Rivers Act. Alternative 5 is the Forest Service preferred alternative.

Comments must be received by _____.

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SUMMARY

I. PURPOSE AND NEED

The Wild and Scenic Rivers System, established through Public Law 90-542, preserves selected outstanding rivers of the Nation in their natural and free-flowing condition. The National Parks and Recreation Act, Public Law 95-625, designated the Greenbrier River of West Virginia for study to determine eligibility and effects of potential inclusion in the Wild and Scenic Rivers System. This draft environmental impact statement deals only with the effects of designation. It does not deal with the effects of actual management which will, if the area is finally designated, be based on an analysis to determine whether designation and management of the area would change the Forest Land and Resource Management Plan.

The Forest Service, as lead agency for the study, is considering a proposed action and alternatives for recommending portions of the Greenbrier River for inclusion in the National System. At this time the Forest Service preferred course of action is Alternative 5, to include all eligible segments from the headwaters to Anthony (133 miles) as scenic and recreational components of the Wild and Scenic Rivers System through the procedure described in Section 2(a)(ii) of the Wild and Scenic Rivers Act. This procedure depends heavily on local or State initiative. Inclusion is through State request to the Secretary of Interior, and management is retained at the State and local level.

Issues and concerns that surfaced during the study include mineral exploration and development, landownership and acquisition, existing public facilities, flood protection, private development, air quality, free-flowing river conditions, water quality and the river's outstanding values, and the public's fear of loss of rights and/or condemnation by a federal managing agency.

A final environmental impact statement/study report responding to comments received will follow. The Forest Service will submit the final environmental impact statement/study report to Congress through the Secretary of Agriculture and the President.

II. ALTERNATIVES INCLUDING PROPOSED ACTIONS

Alternative 1 (No Action) - a continuation of present management, no Wild and Scenic River designation.

Alternative 2 (Full Designation, 199 Miles) - all eligible segments would be legislatively designated by Congress as components of the National Wild and Scenic Rivers System, to be administered by the Forest Service.

Alternative 3 (186 Miles) - all eligible segments would be legislatively designated by Congress as components of the National Wild and Scenic Rivers System, with the exception of a thirteen mile portion for construction of a dry reservoir. The Forest Service would be the managing agency.

Alternative 4 (Designation to Anthony, 133 Miles) - all eligible segments from the headwaters to Anthony would be legislatively designated by Congress as components of the National Wild and Scenic Rivers System, to be administered by the Forest Service.

Alternative 5 (Designation to Anthony, 133 Miles) - The Proposed Action - the same segments proposed under Alternative 4, but inclusion would be through local and State initiative, State request to the Secretary of Interior in accordance with Section 2(a) (ii) of the Wild and Scenic Rivers Act. River segments included in the National System would be administered by State or subdivision of the State.

III. AFFECTED ENVIRONMENT

The Greenbrier River drainage lies along the Browns Mountain Anticline. Lithological classifications within the study corridor include the Mauch Chunk, Greenbrier, Pocono, Hampshire, and Chemung Groups. There are only minor deposits of Pennsylvanian Age coal within the watershed, and essentially no potential for coal mining within the river corridor. There is little potential for oil development and a slight potential for gas development along the Greenbrier. The river corridor is abundant in outcrops of high-purity Greenbrier limestone. There are active quarrying operations within the study corridor. The Greenbrier limestone belt is an unusual geological feature containing an extraordinary number of caves.

The Greenbrier River Valley is rich in history. There are twenty-nine sites that have been selected for the National Register of Historic places.

The Greenbrier River has sufficient flows to permit full enjoyment of water-related outdoor recreation activities. The river has sufficiently high water quality for eligibility to the National System.

The river corridor's air quality is greater than national ambient air quality standards. The river corridor now meets Class II requirements, as defined by the Clean Air Act.

Much of the river corridor is within the recognized floodplain. There are 2508 acres in wetlands within the study corridor that are important wildlife habitat.

There are six mammal and bird species found within the corridor that are classified under the Endangered Species Act of 1973. There are four fish species found in the Greenbrier that have been proposed for classification under this act.

The study corridor contains 47,885 acres. Sixty-nine percent is privately owned, twenty-five percent is National Forest, and six percent is administered by the State as parks, forest, prison, or railroad right-of-way.

IV. ENVIRONMENTAL CONSEQUENCES

Alternatives that propose designation in the Wild and Scenic Rivers System have greater recreation visitor day projections than the no action alternative, with greater value in economic benefits. However, the designation alternatives have greater cost due to planning, facilities construction, and operation and maintenance. Economic effect on mining, agriculture, and forest industries within the corridor are not significantly different between alternatives. Net present value, the sum of all discounted benefits minus all discounted costs, varies between alternatives by a maximum of only 6.6 percent. This small range of values is due to economic benefits, predominantly recreation benefit, being counterbalanced by facility construction and maintenance costs over the study period.

Full designation Alternative 2 proposes the greatest length of river and area under management and protection in the Wild and Scenic Rivers System. Alternatives 3, 4 and 5 propose less of the river to be designated. All of Alternatives 2, 3, 4 and 5 would protect the most natural-appearing length of the Greenbrier, the headwaters to Anthony.

Predominant land use along the lower portion of the river has been established. It is characterized by small river lots, summer homes, fishing camps, and larger communities. Management of this lower river portion as a recreational segment in the National System would probably not provide substantially greater protection than is now provided by the West Virginia Natural Streams Preservation Act.

Alternatives including all or portions of the river in the National System project an increase in recreation use and subsequent growth in recreation, tourism, and service industries. Accompanying, would be an increase in need for local public services.

Alternatives 2, 3, 4, and 5 propose minor private land acquisition (24 to 49 acres) by the Forest Service and State for public access and use sites.

Water impounding flood protection structures would be precluded on river segments proposed for inclusion in the Wild and Scenic Rivers System. Non-structural flood prevention actions and non-impounding flood prevention structures may be compatible in all alternatives. Alternatives proposing inclusion of river segments in the Wild and Scenic Rivers System include development constraints that would reduce the risk of flooding for new development within the corridor.

Air and water quality protection and maintenance opportunities are improved with designation.

There is widespread desire to protect the Greenbrier River and keep its natural character with as little change from present conditions as possible. However, many landowners see legislative designation in the Wild and Scenic Rivers System with federal management, Alternatives 2, 3 and 4, as a threat of land condemnation and loss of landowner rights. Alternative 5 eliminates the threat of condemnation and minimizes loss of landowner rights.

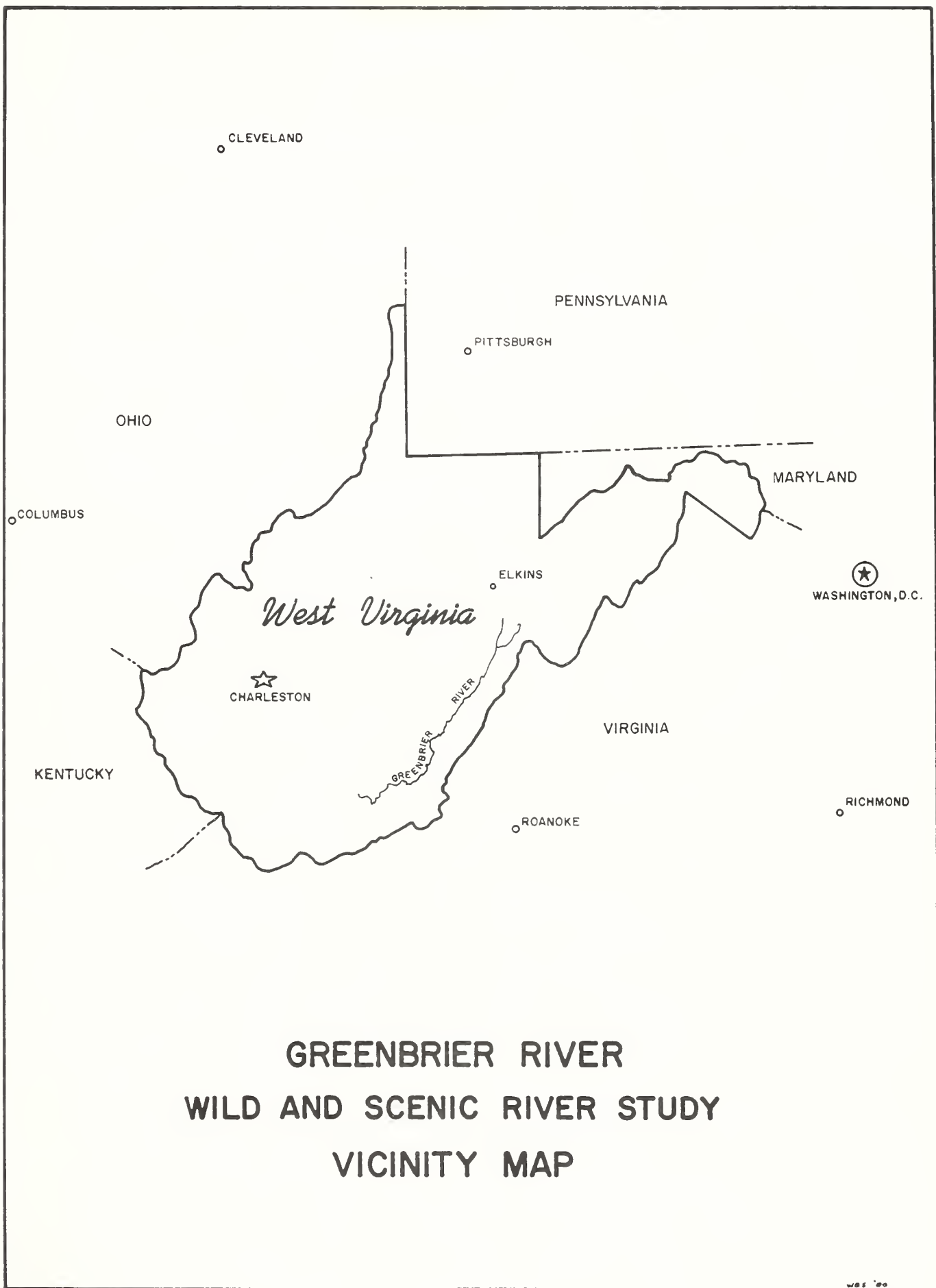


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I. PURPOSE AND NEED

- A. Purpose. The Forest Service is considering a proposed action, and alternatives to it, for recommending designation of eligible portions of the Greenbrier River for inclusion in the National Wild and Scenic Rivers System. At this time the Forest Service prefers the course of action described as Alternative 5.

Under Alternative 5 all eligible segments from the headwaters to Anthony, a total of 133 miles, would be included as components of the Wild and Scenic Rivers System. The ten mile segment of the East Fork, Segment A, from Blister Swamp to Forest Service Road 36 would be classified scenic; the nine mile segment of the East Fork, Segment B, from Forest Service Road 36 to its confluence with the West Fork at Durbin would be classified recreational; the eighteen mile West Fork, from its origin to its confluence with the East Fork, Segment C, would be classified recreational; and ninety-six miles of the mainstem from the confluence of the East and West Forks to Anthony, Segment D, would be classified scenic. These segments would be added to the Wild and Scenic Rivers System through State initiated action in accordance with Section 2(a)(ii) of the Wild and Scenic Rivers Act. Management of the river would be by the State or political subdivision of the State (local management) as determined during preparation of a management plan required by this procedure. Action would be through State or local initiative, not federal. The Forest Service would cooperate in preparation of the management plan and as a land managing entity within the corridor.

- B. Need. Congress enacted Public Law 90-542, the Wild and Scenic Rivers Act, on October 2, 1968. In the Act, Congress declared as a policy that:

"... certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

Congress, in establishing a National Wild and Scenic Rivers System, stated:

"... that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes."

The passage of the National Parks and Recreation Act, Public Law 95-625, on November 10, 1978, amended the Wild and Scenic Rivers Act by designating several rivers for study for potential inclusion in the Wild and Scenic Rivers System. The Greenbrier River, from its headwaters to its confluence with the New River, was designated for study by this amendment. The Forest Service is the lead agency for the study, and responsible for preparation of the environmental impact statement. The draft environmental impact statement deals only with the effects of designation. It does not deal with the effects of actual management, which will, if the area is finally designated, be based on an analysis to determine whether designation and management of the area would change the Forest Land and Resource Management Plan.

C. Major Issues and Concerns to be Addressed

- Opportunities for mineral exploration and development.
- Existing landownership, what lands now privately owned would be needed to manage the river.
- Public development and operations including the Greenbrier River Trail, the Cass Scenic Railroad, Watoga State Park, Seneca and Calvin Price State Forests, and the Green Bank National Radio Astronomy Observatory.
- Flood protection opportunities, including levees and flood-walls, channel widening, and the proposed dry reservoir north of Marlinton.
- Private development along and crossing the river.
- Effect on air quality standards.
- Preservation of the river's free-flowing condition.
- Protection of the river's water quality and outstanding values.
- Public fear or perceived threat of their loss of rights and/or condemnation with management by a federal agency.

D. Location. The river study area includes those counties through which the Greenbrier River flows - Pocahontas, Greenbrier, Monroe and Summers Counties, West Virginia. The study includes the East Fork, West Fork, and mainstem of the Greenbrier River. The East Fork from Blister Swamp to its confluence with the West Fork is nineteen miles long. The West Fork from Wildell to the confluence is eighteen miles long. The mainstem, 162 miles in length, begins at the confluence of the East and West Forks at Durbin and ends at the confluence with New River at Hinton. The Greenbrier flows through land administered by the Monongahela National Forest, the Green Bank National Radio Astronomy Observatory, the State of West Virginia, as well as through numerous private ownerships.

- E. The Environmental Analysis/River Study Process. Public issues and management concerns were identified through public meetings and solicitation of written comments. Alternatives to respond to the issues and concerns were developed. A preferred alternative has been identified based on response to issues and concerns and the estimated effects of each alternative on the human environment. Physical, biological, and social as well as economic components of the human environment have been considered. This draft environmental impact statement/study report documents the results of the environmental analysis and the study of the river's eligibility.

This document has been circulated for public comment. A final environmental impact statement/study report will be prepared in response to the comments received. The final environmental impact statement/study report will be submitted by the Forest Service to Congress through the Secretary of Agriculture and the President. The Secretary will make recommendations concerning the proposed action to the President who in turn will make recommendations to the Congress. The Congress will consider the recommendations it receives. Congress may either act on, reject or modify the proposed action and/or an alternative to it, or may not act on the recommendation.

Copies of the Wild and Scenic Rivers Act, this document, all documents referenced and other records developed during preparation of this document are available for public review in the Forest Service office in Elkins, West Virginia.

II. ALTERNATIVES INCLUDING PROPOSED ACTION

- A. Alternative Formulation. Constraints are needed to avoid the formulation of alternatives having no potential for serious consideration. The following constraints have been identified:
- An alternative must comply with direction of the Wild and Scenic Rivers Act.
 - An alternative must comply with other existing federal laws and regulations including the Antiquities Act, the Endangered Species Act, the Protection of Wetlands Executive Order, and the Floodplain Management Executive Order.
 - An alternative must be feasible and manageable.
 - Alternatives must be unique and distinct from one another.
 - At least one alternative should represent the interests of the State of West Virginia.
 - One alternative must be the taking of no action.
 - Alternatives must respond to one or more of the major issues and concerns. All issues must be addressed by at least one alternative.

The alternatives proposed amount to recommending all or fewer eligible segments of the river for designation and either Federal or State (or political subdivision of the State) management of the river.

B. Alternatives Considered

Alternative 1 (No Action) - a continuation of present management. Future options for development remain open.

Future management of those lands under management of the Monongahela National Forest would be directed by the Forest Land Management Plan, scheduled to be completed in 1983. Forest Service projects proposed prior to the completion of the Forest Land Management Plan would be evaluated by individual environmental assessment. Lands administered by the National Radio Astronomy Observatory and the West Virginia Department of Natural Resources continue under current management. The Greenbrier River from its confluence with Knapp Creek at Marlinton to its confluence with New River at Hinton is currently protected under the West Virginia Natural Streams Preservation Act. Protection of this river segment would continue under this State act. All private lands would be available for maximum economic development, needing only to comply with local, State, and federal laws.

This alternative does not include acquisition of land by a managing agency for wild and scenic river purposes. The existing National Forest Greenbrier River Recreation Composite lies within the study corridor. The National Forest may now acquire lands on a willing seller-willing buyer basis within that portion of the study corridor covered by the composite.

Alternative 1, in response to issues and concerns:

- maintains existing opportunities for mineral exploration and development, imposing no restrictions for the purposes of protection and management within the Wild and Scenic Rivers System.
- does not include acquisition of privately owned lands for wild and scenic river purposes.
- does not adversely effect or complement existing and planned public development.
- maintains existing opportunities for construction of flood protection devices.
- maintains existing opportunities for private development along and crossing the river.
- does not provide opportunity for higher air quality standards.

- provides no additional protection for the free-flowing condition of the river above what is currently provided by the State Streams Preservation Act.
- provides no assurance for protection of the river's water quality and outstanding values above what is currently provided by existing state and federal laws.
- provides no basis for public fear or perceived threat of their loss of rights and/or condemnation of the river in the Wild and Scenic Rivers System.

Alternative 2 (Full Designation, 199 Miles, Federal Management)
Under Alternative 2 all eligible segments would be legislatively designated by Congress as components of the National Wild and Scenic Rivers System to be administered by a federal land managing agency. The ten mile segment of the East Fork, Segment A, from Blister Swamp to Forest Service Road 36 is classified scenic; the nine mile segment of the East Fork, Segment B, from Forest Service Road 36 to its confluence with the West Fork at Durbin is classified recreational; the eighteen mile West Fork segment, from its origin to its confluence with the East Fork, Segment C, is classified recreational; the 109 mile, Segment D, of the Greenbrier, from the confluence of the East and West Forks to the Interstate Route 64 bridge is classified scenic; and the fifty-three mile segment of the Greenbrier, from the I-64 bridge to its confluence with New River at Hinton, Segment E, is classified recreational.

The Forest Service is the major federal land managing agency within the Greenbrier River Basin. This alternative proposes the Forest Service as the managing agency for the Greenbrier as a federally administered component of the Wild and Scenic Rivers System.

A river corridor averaging 240 acres per mile of river, totalling approximately 47,885 acres is in this alternative. Of this total acreage, 15,078 acres are public administered lands and 32,807 acres are privately owned. Both public and private land development and resources use within this corridor would comply with the Wild and Scenic River Act, guidelines, and management plan.

Recreation facility development is included in this alternative. Increased recreation use would be expected due to the Greenbrier receiving national attention as a scenic and a recreational river.

Traditional uses and patterns may change, with accompanying user conflicts. For example, canoeists may conflict with fishermen. Increases in recreation use of the corridor is expected regardless of designation. Uncontrolled development and use from increasing recreational demand could result in undesirable environmental impacts to the river. Designation provides opportunity for development and use controls to reduce user conflicts and undesirable environmental impacts.

Alternative 2, in response to issues and concerns:

- addresses opportunities for mineral exploration and development by proposing designation which, with its associated plan, would prevent mineral development that would detract from the river's qualities.
- includes 49 acres of private land acquisition by the National Forest and State for public access and use sites.
- considers existing and planned public development. This alternative proposes designation that would tie existing public development areas and their planned expansion and improvement together offering to the public a unique recreational opportunity.
- prohibits water impounding flood protection devices.
- addresses private development along and crossing the river. Designation with its associated plan, would permit existing development but restrict future development that would detract from the river's qualities.
- provides opportunity for higher air quality standards with wild and scenic river designation in conjunction with the Clean Air Act.
- addresses preservation of the river's free-flowing condition by proposing designation which would protect the entire length of the Greenbrier as a free-flowing river.
- protects the river's water quality and outstanding values as a component of the Wild and Scenic Rivers System.
- proposing designation through federal legislation and with federal management may result in some public's fear of the loss of their loss of rights, and/or federal acquisition of land by condemnation.

Alternative 3 (186 Miles, Federal Management) - Alternative 3 proposes federal legislative designation of all eligible segments as components of the National Wild and Scenic Rivers System as in Alternative 2, with the exception of a thirteen mile portion of scenic Segment D, north of Marlinton. The Forest Service would be the managing agency in a federally administered component of the National System.

The potential for developing hydro-electric power at Bluestone Lake on New River at Hinton is under study by the Corps of Engineers. One possibility is the addition of conventional power facilities to the Bluestone Dam. Development of hydro-electric power at Bluestone Lake would require the current summer pool to be raised. Increasing the quantity of water held in Bluestone Reservoir for purposes of power generation would reduce the dam's flood control capability for New River. The

Corps of Engineers has proposed a dry reservoir located on the Greenbrier River above Marlinton to compensate for this loss of flood control capability. The Marlinton dry reservoir would be regulated to control flows from the Greenbrier River emptying into New River at Hinton. The dry reservoir would also provide flood protection for Marlinton and other communities south along the Greenbrier River. The design of the dry reservoir allows passage of normal river flows with water storage only when needed to regulate flows on the Greenbrier and New Rivers. Maximum water impoundment would extend upstream thirteen miles.

Alternative 3 evaluates only the effects of non-designation of the area affected by the dry reservoir. It does not include the reservoir's construction and maintenance costs or flood reduction benefits.

A river corridor averaging 239 acres per mile of river, totalling approximately 44,397 acres of public and private land is in this alternative. Of this total acreage, 14,490 acres are public administered lands and 29,907 acres are privately owned. Constraints on public and private land and resource use within the designated segments are identical to Alternative 2. However, use and development within the thirteen mile section excluded from designation would be limited by local regulations and easements.

Alternative 3 in response to issues and concerns:

- addresses opportunities for mineral exploration and development by proposing designation which, with its associated plan, would prevent mineral development that would detract from the river's qualities.
- includes 49 acres of private land acquisition by the National Forest and State for public access and use sites.
- considers existing and planned public development. This alternative proposes designation that would tie existing public development areas and their planned expansion and improvement together offering to the public a unique recreational opportunity.
- addresses flood protection opportunities by excluding a portion of the river from designation for construction of the proposed Marlinton dry reservoir.
- addresses private development along and crossing the river. Designation with its associated plan, would permit existing development but restrict future development that would detract from the river's qualities.
- provides opportunity for higher air quality standards with wild and scenic river designation in conjunction with the Clear Air Act.

- addresses preservation of the river's free-flowing condition by proposing designation which would protect two portions of the Greenbrier in a free-flowing condition.
- protects the river's water quality and outstanding values as a component of the Wild and Scenic Rivers System.
- proposing designation through federal legislation and with federal management may result in some public's fear of their loss of rights, and/or federal acquisition of land by condemnation.

Alternative 4 (133 Miles, Federal Management) - Under Alternative 4, Segments A, B, C and D would be legislatively designated by Congress as components of the National Wild and Scenic Rivers System, as in Alternative 2. However, scenic Segment D, beginning at the confluence of the East and West Forks, would terminate at Anthony. Segment D would be reduced to ninety-six miles long and Segment E would not be designated.

The Forest Service would be the managing agency in a federally administered component of the National System.

The landownership pattern changes abruptly at Anthony. Privately owned land within the study corridor for full designation of all eligible segments (Alternative 2) accounts for sixty-nine percent of the total. The balance is administered for public use by federal and State agencies. Privately owned land within the study corridor for Alternative 4 is fifty-two percent of the total. A greater percentage of publically administered land in Alternative 4 (48%) when compared to publically administered land in Alternative 2 (31%) could have significant differences in effects. For example, Section 6(b) of the Wild and Scenic Rivers Act prohibits land acquisition by condemnation within the river corridor (except for easement) once fifty percent or more of the entire acreage within a federally administered river is publically owned.

A river corridor averaging 230 acres per mile of river, totalling approximately 30,700 acres is in this alternative. Of this total acreage, 14,698 acres are public administered lands and 16,002 acres are privately owned. Constraints on public and private land and resource use within the designated segments would be identical to Alternative 2. The Greenbrier River below Anthony would continue to be protected under the West Virginia Natural Streams Preservation Act.

Alternative 4, in response to issues and concerns:

- addresses opportunities for mineral exploration and development by proposing designation which, with its associated plan, would prevent mineral development that would detract from the river's qualities.
- includes 24 acres of private land acquisition by the Forest Service and State for public access and use sites.

- considers existing and planned public development. This alternative proposes designation that would tie existing public development areas and their planned expansion and improvement together offering to the public a unique recreational opportunity.
- prohibits water impounding flood protection devices.
- addresses private development along and crossing the river. Designation, with its associated plan, would permit existing development but restrict future development that would detract from the river's qualities.
- provides opportunity for higher air quality standards with wild and scenic river designation in conjunction with the Clean Air Act.
- addresses preservation of the river's free-flowing condition by proposing protection of the entire length of the Greenbrier through wild and scenic river designation and the State Streams Preservation Act.
- protects the river's water quality and outstanding values as a component of the Wild and Scenic Rivers System.
- proposing designation through federal legislation and with federal management may result in some public's fear of the loss of their rights, and/or federal acquisition of land by condemnation.

Alternative 5 Proposed Action (133 Miles, State-Local Management) - Alternative 5 proposes the same segments as Alternative 4 for inclusion in the National Wild and Scenic Rivers System. But inclusion would be through State request to the Secretary of Interior in accordance with Section 2(a)(ii) of the Wild and Scenic Rivers Act. Management would be by State or subdivision of the State, as determined in preparation of a management plan.

Alternative 5 is like Alternative 4 in responding to issues and concerns, except that Alternative 5 provides no basis for public fear or perceived threat of their loss of rights and/or condemnation with federal management of the river in the Wild and Scenic River System.

This study has found widespread desire to protect the Greenbrier River and keep its natural character with as little change from present conditions as possible. There has not been agreement on how this can be accomplished.

Protecting a river's naturalness through inclusion in the National Wild and Scenic Rivers System requires the active support of all parties involved. This includes federal, State and local government, interest group, riparian landowner, and other public entities. Riparian landowners, for the most part, have opposed designation. Local government and some special interest groups support the landowners in opposition. They have presumed that the Forest Service or National Park Service would be named the managing agency if the Greenbrier was included in the National System by act of Congress, as provided in Section 2(a)(i) of the Wild and Scenic Rivers Act. The public and local governments in opposition to wild and scenic designation fear that federal management will impose constraints that are too restrictive. The ultimate fear is condemnation of land or easement by a federal managing agency as a method for controlling incompatible land uses.

Section 2(a)(ii) of the Wild and Scenic Rivers Act provides a procedure that may resolve these concerns of legislative designation and federal management and at the same time provide protection for the Greenbrier River.

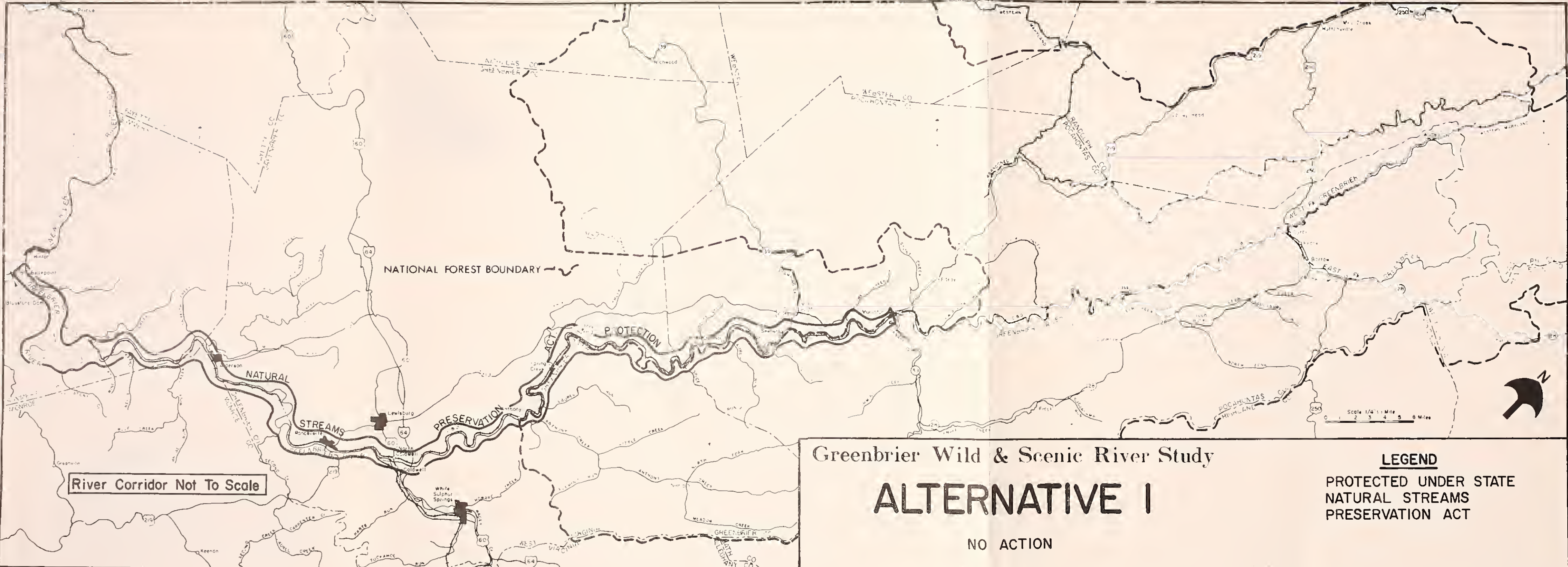
Under this procedure:

- Publics interested in preservation of the Greenbrier River would request that the river from its headwaters to its confluence with Knapp Creek at Marlinton be protected by an act of State legislature, amending the West Virginia Natural Streams Preservation Act. (The river below Knapp Creek is now protected by this act).
- Publics interested in preservation of the Greenbrier River would establish a board or commission through the local county governments. The purpose of this board would be to formulate a plan for the river and adjacent lands. A comprehensive management plan would include corridor boundaries, development and land use controls, and facilities planning. Federal, State, city, special interest group, landowner, and other interests would be consulted and involved in preparing the plan. The board would work directly with the State Department of Natural Resources in defining management responsibility.
- The board would seek inclusion in the Wild and Scenic Rivers System through a State Department of Natural Resources request for consideration by the State Governor.
- The Governor would review the management plan for approval, and support. The Governor would then forward a letter to the Secretary of the Interior requesting that the Greenbrier River be added to the National System.
- The Secretary of Interior would make a determination that the management plan is sufficient and is being effectively implemented to warrant inclusion in the system.

- The Secretary of Interior would then submit the proposal to the Secretaries of Agriculture and Army, the Chairman of the Federal Power Commission, and heads of other affected federal agencies for review and comment as required in Section 4(c) of the Act.
- Finally, upon Secretarial approval of the State's request, the Greenbrier would be added to the National Wild and Scenic Rivers System by publishing notice in the Federal Register.

This approach provides protection for the Greenbrier River in the National System while providing a comprehensive and working management plan prior to designation. It retains control of the river at State and local level and should eliminate public apprehension associated with federal management.

Alternative 5 most closely represents the interest of the State of West Virginia. The Department of Natural Resources' written preliminary position and the State representative for wild and scenic river studies cooperating on the Greenbrier study have indicated support for designation upstream from Caldwell. The State has particular interest in the stretch of river from Caldwell to Durbin. The Greenbrier River Trail, Seneca State Forest and camping facilities, Calvin Price State Forest, Watoga State Park, the Cass Scenic Railroad, and the old Chessie System Railroad right-of-way parallel this stretch of river, and are now under Department of Natural Resource's management.



River Corridor Not To Scale

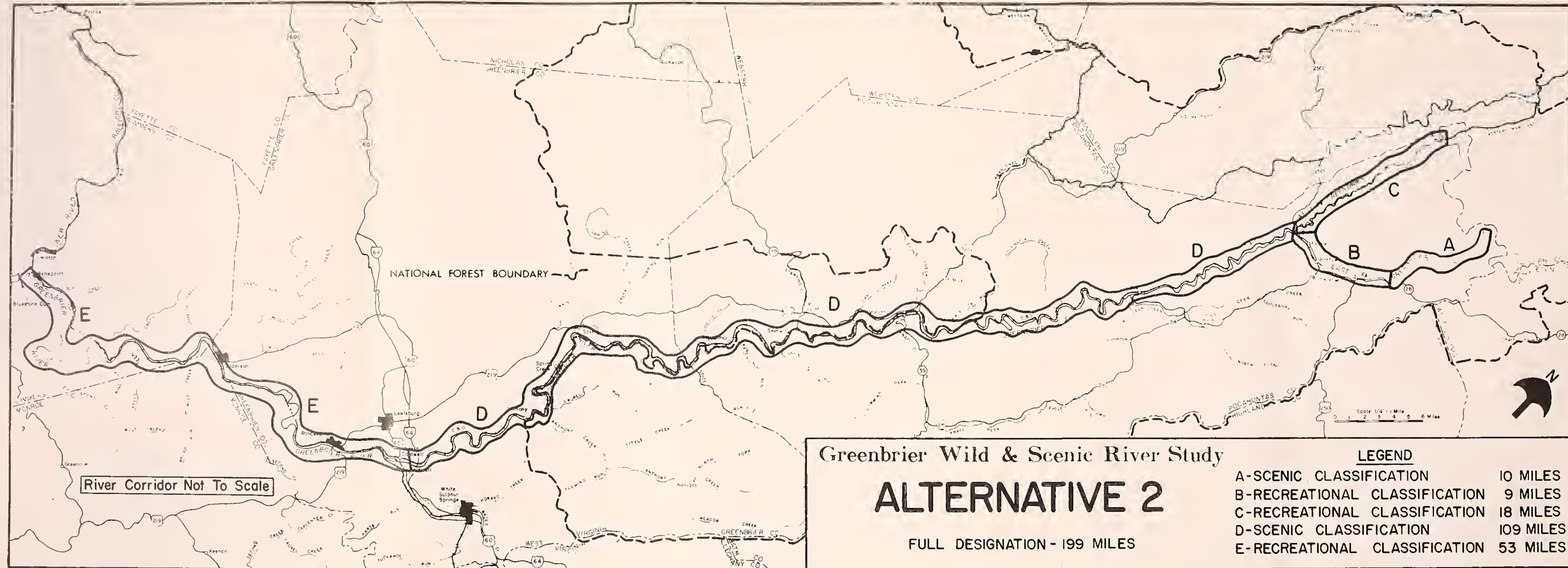
Greenbrier Wild & Scenic River Study

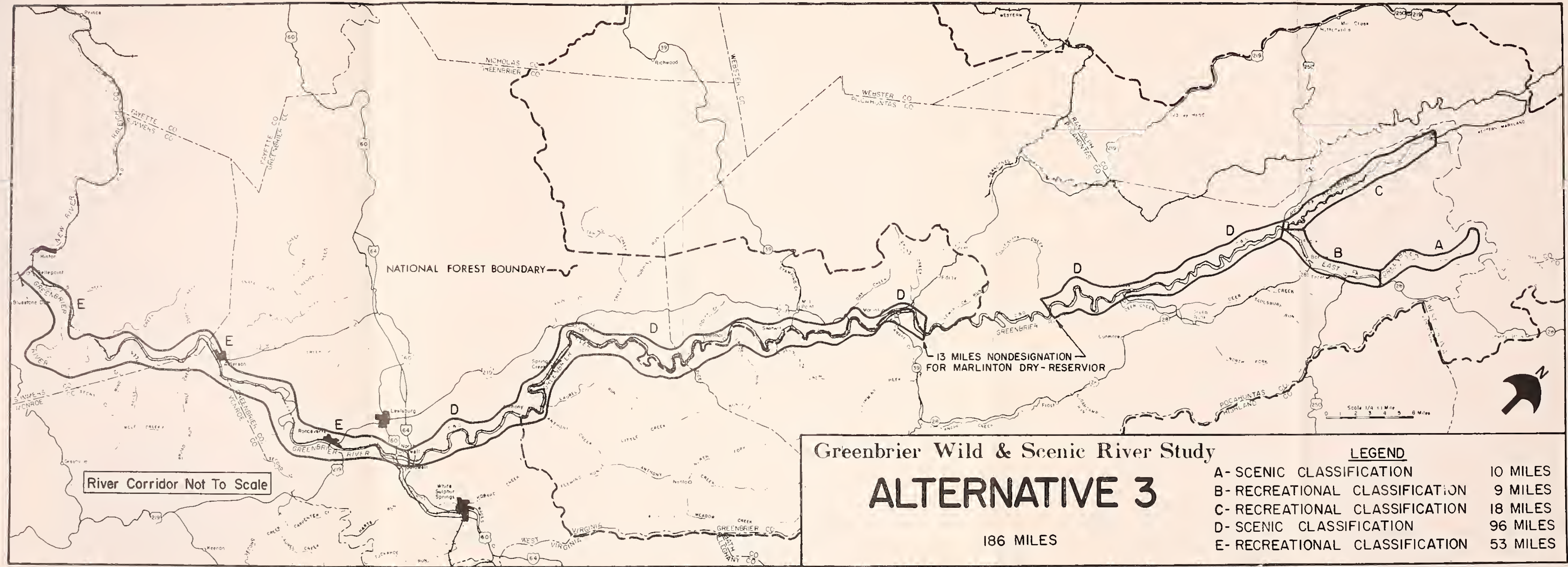
ALTERNATIVE I

NO ACTION

LEGEND

PROTECTED UNDER STATE
NATURAL STREAMS
PRESERVATION ACT





C. Alternatives Considered and Eliminated from Detailed Study

An alternative to designate the eligible segments as specified in Alternative 2 with the exception of a four mile portion of scenic Segment D has been considered. The Kanawha River Comprehensive Basin Study completed in 1979 identified the need for flood protection measures along the Greenbrier River. Marlinton, a community of approximately 1,300 people is susceptible to frequent flooding with average annual property damages amounting to \$650,000. A current study by the Department of the Army, Corps of Engineers, involves a four mile local flood protection project for Marlinton. Deletion of this four mile section of Segment D from designation would permit the construction of flood prevention structures using fundamental techniques of straight bottomed channelization and conspicuously engineered levees.

Further detail of the proposed project has shown the channel would be modified to provide a three hundred foot width for 10,500 feet upstream and 9,500 feet downstream from the mouth of Knapp Creek. An earth levee, averaging 4½ feet in height would be located along the left descending bank tying into a higher point of ground near the mouth of Knapp Creek. Such a project with mitigating measures may be compatible with Wild and Scenic river designation. The Secretary charged with administration of a river included in the National System would make this determination in accordance with Section 7 of the Act. Detailed plans for the Marlinton local flood protection project are not available to make this determination or to treat the affected area as an exception to legislative designation. Therefore, this alternative has been eliminated from further consideration.

Alternatives similar to Alternative 2 (full designation - 199 miles) and Alternative 3 (186 miles) except with State request to the Secretary of the Interior for designation and State-local management, have been considered. The Section 2(a) (ii) procedure described under Alternative 5 would be followed. This procedure requires State and local initiative and interest. The State of West Virginia has not submitted a final position statement on Greenbrier River scenic and recreational designation. The West Virginia Department of Natural Resources has indicated interest in cooperative management for the river north of Caldwell. The Forest Service would not be involved south of Anthony, as the National Forest Proclamation Boundary ends at this point on the Greenbrier River.

The State has not indicated interest in the lower portions of the Greenbrier as a Wild and Scenic river. Alternatives similar to 2 and 3, but with State request for designation under State-local management have been eliminated from further consideration.

D. Comparison of Alternatives

Comparison of the alternatives' effects on the human environment is displayed in tables in this section. Alternatives' effects on economic, physical/biological, and social components of the human environment have been considered.

The economic account table, pages 19-21, includes factors that contribute to monetary benefits or costs associated with the actions, or no action, proposed in the alternatives.

Alternatives that propose designation in the Wild and Scenic Rivers System have greater recreation visitor day projections than the no action alternative, with greater value in economic benefits. However, the designation alternatives have greater cost due to planning, facilities construction, and operation and maintenance. Economic effect on mining, agriculture, and forest industries within the corridor are not significantly different between alternatives. Net present value, the sum of all discounted benefits minus all discounted costs, varies between alternatives by a maximum of only 6.6 percent. This small range of values is due to economic benefits, predominantly recreation benefit, being counterbalanced by facility construction and maintenance costs over the study period.

Alternatives' effects on the physical and biological components of the environment are displayed on the table on pages 22-24.

Full designation Alternative 2 proposes the greatest length of river and area under management and protection in the Wild and Scenic Rivers System. Alternatives 3, 4, and 5 propose less of the river to be designated. All of Alternatives 2, 3, 4, and 5 would protect the most natural-appearing length of the Greenbrier, the headwaters to Anthony.

Predominant land use along the lower portion of the river has been established. It is characterized by small river lots, summer homes, fishing camps, and larger communities. Management of this lower river portion as a recreational segment in the National System would probably not provide substantially greater protection than is now provided by the West Virginia Natural Streams Preservation Act.

Alternatives' effects on the social component of the environment are displayed on the table on pages 25-28.

Alternatives including all or portions of the river in the National System project an increase in recreation use and subsequent growth in recreation, tourism, and service industries. Accompanying, would be an increase in need for local public services.

Alternatives 2, 3, 4, and 5 propose minor private land acquisition (24 to 49 acres) by the Forest Service and State for public access and use sites.

Water impounding flood protection structures would be precluded on river segments proposed for inclusion in the Wild and Scenic Rivers System. Non-structural flood prevention actions and non-impounding flood prevention structures may be compatible in all alternatives. Alternatives proposing inclusion of river segments in the Wild and Scenic Rivers System include development constraints that would reduce the risk of flooding for new development within the corridor.

Air and water quality protection and maintenance opportunities are improved with designation.

There is widespread desire to protect the Greenbrier River and keep its natural character with as little change from present conditions as possible. However, many landowners see legislative designation in the Wild and Scenic Rivers System with federal management, Alternatives 2, 3, and 4, as a threat of land condemnation and loss of landowner rights. Alternative 5 eliminates the threat of condemnation and minimizes loss of landowner rights.

COMPARISON OF EFFECTS ON THE ECONOMIC COMPONENT OF HUMAN ENVIRONMENT
PROJECTED OUTPUT AND VALUE FOR YEAR 2000
DISPLAYED IN 1980 DOLLAR VALUES

<u>Account Component</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
Outdoor Recreation (Projected annual output in recreation visitor days - RVDS - and dollars)				
Camping	RVDS 51,800 \$ 163,170	70,900 223,335	70,300 221,445	64,500 203,175
Picnicking	RVDS 7,400 \$ 23,310	13,400 42,210	13,000 40,950	11,300 35,595
Hunting	RVDS 14,800 \$ 46,028	16,400 51,004	16,300 50,693	15,800 49,138
Fishing	RVDS 29,600 \$ 92,056	75,100 233,561	69,800 217,078	59,300 184,423
Hiking	RVDS 14,800 \$ 46,620	32,000 100,800	32,000 100,800	32,000 100,800
Boating	RVDS 22,200 \$ 67,932	52,200 159,732	52,200 159,732	42,300 129,438
Other Dispersed	RVDS 7,400 \$ 19,402	16,000 42,080	15,400 40,502	12,900 33,923
Total Outdoor Recreation	RVDS 148,000 \$ 458,518	276,000 852,722	269,000 831,200	238,100 736,492

Manufacturing and Industry Projected limited growth: insignificant differences between alternatives.

COMPARISON OF EFFECTS ON THE ECONOMIC COMPONENT OF HUMAN ENVIRONMENT
PROJECTED OUTPUT AND VALUE FOR YEAR 2000
DISPLAYED IN 1980 DOLLAR VALUES
(Continued)

<u>Account Component</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
Mineral Exploration and Development (Acres restricted)	15,029	43,820	42,722	27,866
	projected limited mineral development: insignificant differences between alternatives.			
Agriculture (Annual products value)				
Crops	88,720	88,720	88,720	88,720
Livestock	270,923	270,923	270,923	270,923
TOTAL Agriculture	<u>\$359,643</u>	<u>\$359,643</u>	<u>\$359,643</u>	<u>\$359,643</u>
Forest Industries (Annual output in MBF's, cords, and value)				
Sawtimber: thousands board feet, value	3,351 \$160,848	2,234 \$107,232	2,234 \$107,232	2,799 \$135,352
Small Roundwood: cords, value	<u>13,687 \$ 6,844</u>	<u>9,125 \$ 4,563</u>	<u>9,125 \$ 4,563</u>	<u>11,434 \$ 5,717</u>
TOTAL Forest Industries: thousands board feet and value	10,195 \$167,692	6,796 \$111,795	6,796 \$111,795	8,516 \$141,069

Use of Otherwise Unemployed or Otherwise Underemployed Labor Resources	River study area not within counties with "substantial and persistent unemployment" as eligible under Section 1, Title IV of the Public Works and Development Act of 1965 (P.L. 89-136).
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COMPARISON OF EFFECTS ON THE ECONOMIC COMPONENT OF HUMAN ENVIRONMENT
DISPLAYED IN 1980 DOLLAR VALUES

<u>Account Component</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
Implementation Outlays:				
Postauthorization				
Planning Costs		\$ 35,000	\$ 35,000	\$ 35,000
Construction Costs	\$ 89,500*	\$967,500	\$928,000	\$629,900
Construction				
Contingency Costs	\$ 4,475*	\$ 48,375	\$ 46,400	\$ 31,495
Current Public				
Ownership		15,029 Acs.	14,441 Acs.	14,674 Acs.
Current Private				
Ownership		32,856 Acs.	29,956 Acs.	16,026 Acs.
<u>Total Acreage</u>		<u>47,885 Acs.</u>	<u>44,397 Acs.</u>	<u>30,700 Acs.</u>
Land and ROW				
Acquisition Needs		49 Acs.	49 Acs.	24 Acs.
Land and ROW Costs**		\$166,500	\$166,500	\$ 66,500
Annual Operation and				
Maintenance Costs				
(For year 200 with				
all planned facilities				
completed).	\$134,300	\$230,700	\$228,100	\$200,100

INVESTMENT ANALYSIS

DISCOUNTED AT 7 5/8% VALUES EXPRESSED IN 1980 DOLLARS

Total Benefit Value	\$9,019,669	\$10,448,176	\$10,424,686	\$9,925,344
Total Implementation				
Outlay	\$1,206,038	\$ 2,127,862	\$ 2,097,355	\$ 1,833,449
Net Present Value	\$7,813,631	\$ 8,320,314	\$ 8,327,331	\$ 8,091,895

*Forest Service Planned Development

**Fee Simple Acquisition Only - Assumes Local Development Control on Private Lands.

COMPARISON OF EFFECTS ON THE PHYSICAL/BIOLOGICAL COMPONENTS OF HUMAN ENVIRONMENT

Account Component	Resource Attribute	Indicator	Alternative 1 (No Designation)	Alternative 2 (Full Designation) 199 Miles	Alternative 3 (186 Miles)	Alternatives 4 and 5 (133 Miles)
Geology	Ecological Aesthetic	Unusual ecosystem- Karst, rare and endangered species habitat.	11,900 acres Karst geology under federal or state management.	36,193 acres Karst geology under wild and scenic river management.	32,705 acres Karst geology under wild and scenic river management.	19,008 acres Karst geology under wild and scenic river management.
Soil	Ecological Aesthetic	Erosion, sedimentation	15,029 acres federal or state management, constraints on individual project basis.	47,885 acres wild and scenic river development and management constraints.	44,397 acres wild and scenic river development and management constraints.	30,700 acres wild and scenic river development and management constraints.
Water	Ecological Aesthetic	Fish and wildlife aquatic habitat. Human consumptive use. Color, odor, taste, flotation.	Water quality subject to management constraints on individual project basis.	Legislatively requires maintenance of water quality of 199 river miles.	Legislatively requires maintenance of water quality of 186 river miles.	Legislatively requires maintenance of water quality of 133 river miles.
(Federal Water Pollution Control Act Amendments of 1972 state national goal that all waters of United States be fishable and swimmable by July 1, 1983).						
Fish and Wildlife	Ecological Aesthetic	Habitat management and protection, vegetation diversity Visual experience observing wildlife.	15,029 acres federal or state. No commitment for protection or loss of habitat on private lands.	Provides long-term protection for 47,885 acres. Retains future options for enhancement of habitat.	Provides long-term protection for 44,397 acres. Retains future options for enhancement of habitat.	Provides long-term protection for 30,700 acres. Retains future options for enhance- ment of habitat.
Rare and Endangered Species	Ecological Aesthetic	Species preservation, habitat management, Endangered Species Act. Visual experience observing rare and endangered species.	Development of private land will diminish habitat, public use could disturb R&E species.	Wild & Scenic river development and management constraints will protect habitat.	Wild & Scenic river development and management constraints will protect habitat.	Wild & Scenic river development and management constraints will protect habitat.

Designation will attract public, could disrupt R&E species,
including fish species proposed for R&E classification.

COMPARISON OF EFFECTS ON THE PHYSICAL/BIOLOGICAL COMPONENTS OF HUMAN ENVIRONMENT
(Continued)

<u>Account Component</u>	<u>Resource Attribute</u>	<u>Indicator</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
Air	Ecological	Air quality and emission limitations specified by the Clean Air Act.	Designated Class II area by Section 162 Clean Air Act, 47,885 acres.	State may redesignate as Class I by Section 164 Clean Air Act, 47,885 acres.*	State may redesignate as Class I by Section 164 Clean Air Act, 44,397 acres.*	State may redesignate as Class I by Section 164 Clean Air Act, 30,700 acres.*
Historical and Cultural	Social	Antiquities Act 1906 Antiquities Act 1980 State Caves Protection Act.	Archaeological and historical sites protected on federal land, all caves.	Archaeological and historical sites protected on federal lands, all caves.	Archaeological and historical sites protected on federal land, all caves.	Archaeological and historical sites protected on federal land, all caves.
Visual Resources	Aesthetic	Forest Service Visual Management System, vegetation diversity and man-made structure influences.	15,029 acres federal or state management, constraints on individual project basis.	Legislative protection from visual degradation on 47,885 acres.	Legislative protection from visual degradation on 44,397 acres.	Legislative protection from visual degradation on 30,700 acres.
Free-Flowing conditions	Ecological	Wild & Scenic Rivers Act, West Virginia Natural Streams Preservation Act.	114 miles protected by State Natural Streams Preservation Act.	119 miles wild and scenic protection as scenic. 80 miles wild and scenic protection as recreational. 199 miles total protected as free-flowing.	106 miles wild and scenic protection as scenic. 80 miles wild and scenic protection as recreational. 186 miles total protected as free-flowing.	106 miles wild and scenic protection as scenic. 27 miles wild and scenic protection as recreational. 133 miles total wild and scenic. Additional 66 miles protected by State Natural Streams Preservation Act. 199 miles total protected as free-flowing.

*State has option of designation Class I or Class II per Section 164, Clean Air Act.

COMPARISON OF EFFECTS ON THE PHYSICAL/BIOLOGICAL COMPONENTS OF HUMAN ENVIRONMENT
(Continued)

<u>Account Component</u>	<u>Resource Attribute</u>	<u>Indicator</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
Wetlands	Ecological Aesthetic	Executive Order 11990. Protection of wetlands for wildlife habitat, unique plant life.	578 acres wetlands under federal management protected by E.O. 11990.	2508 acres wetlands protected by wild and scenic river development and management constraints.	2327 acres wetlands protected by wild and scenic river development and management constraints.	1687 acres wetlands protected by wild and scenic river development and management constraints.
Irreversible Commitment of Resources						
			Irreversible commitments of resources evaluated on individual project basis on 11,968 acres federal management. No assurances of irreversible commit- ments on private.	Irreversible commitments of resources not compatible with wild and scenic designation prohibited on 47,885 acres.	Irreversible commitments of resources not compatible with wild and scenic designation prohibited on 44,397 acres.	Irreversible commitments of resources not compatible with wild and scenic designation prohibited on 30,700 acres.
Irretrievable Commitment of Resources						
			Benefits, oppor- tunities, outputs associated with scenic and recreational segments may be lost.	Benefits, oppor- tunities, outputs associated with unrestricted development and resource use may be lost.	Effects on non-designated segments described under Alternative 1. Effects on designated segments described under Alternative 2.	

COMPARISON OF EFFECTS ON THE SOCIAL COMPONENT OF HUMAN ENVIRONMENT

<u>Account Component</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
<u>URBAN AND COMMUNITY IMPACTS</u>				
Income Distribution	Recreation, tourism, and service industries expected to increase.	Recreation, tourism, and service industries expected to increase. Short-term increase in construction industry with recreation development.	Recreation, tourism and service industries expected to increase. Short-term increase in construction industry with recreation development.	Recreation, tourism, and service industries expected to increase. Short-term increase in construction industry with recreation development.
Local Public Services	Increased needs with increased recreation visitation.	Increased needs with increased recreation visitation.	Increased needs with increased recreation visitation.	Increased needs with increased recreation visitation.
Employment Distribution	River study area not within counties with "substantial and persistent unemployment" as eligible under Section 1, Title IV of the Public Works and Development Act of 1965 (P.L. 89-136). Recreation, tourism, and service industries will increase. No other major shifts in employment projected (minority or otherwise) in any alternative.			
Population Distribution	Increases in population expected to concentrate near existing communities for all alternatives. No differences in composition between alternatives anticipated.			

COMPARISON OF EFFECTS ON THE SOCIAL COMPONENT OF HUMAN ENVIRONMENT
(Continued)

<u>Account Component</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
<u>LIFE, HEALTH, AND SAFETY</u>				
<u>Risk of Flood</u>	No assurances for existing or new development on private lands. E.O. 11988, Floodplain Management, constrains new construction on federal floodplain only.	No assurances for existing development. Scenic segments development constraints will reduce risk of flood for new development on public and private floodplains within corridor, 119 miles. E.O. 11988 constrains new construction on federal floodplain.	No assurances for existing development. Scenic segments development constraints will reduce risk of flood for new development on public and private floodplains within corridor, 106 miles. E.O. 11988 constrains new construction on federal floodplain.	No assurances for existing development. Scenic segments development constraints will reduce risk of flood for new development on public and private floodplains within corridor, 106 miles. E.O. 11988 constrains new construction on federal floodplain.

COMPARISON OF EFFECTS ON THE SOCIAL COMPONENT OF HUMAN ENVIRONMENT
(Continued)

<u>Account Component</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
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LIFE, HEALTH, AND SAFETY
(Continued)

Water Quality

Water quality maintained and improved where necessary on 133 miles by Section 4, WV Administrative Regulations Chapters 20-5 and 20-5a.	Water quality maintained and improved where necessary on 199 miles by Section 4, WVAR chapters 20-5 and 20-5a, and federal Wild & Scenic River legislation.	Water quality maintained and improved where necessary on 199 miles by Section 4, WVAR chapters and 20-5a, and federal Wild & Scenic River legislation, 186 miles.	Water quality maintained and improved where necessary on 133 miles by Section 4, WVAR chapters 20-5 and 20-5a and federal Wild & Scenic River legislation.
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Federal Water Pollution Control Act Amendments of 1972 state national goal that all waters of United States be fishable and swimmable by July 1, 1983.

Air Quality

Air quality and emission limitations (Class II) by Section 162, Clean Air Act, 47,885 acres.	State may redesignate as Class I by Section 164, Clean Air Act, 47,885 acres.	State may redesignate as Class I by Section 164, Clean Air Act, 44,397 acres.	State may redesignate as Class I by Section 164, Clean Air Act, 30,700 acres.
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DISPLACEMENT

No impact.	No impact.	No impact.	No impact.
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ENERGY REQUIREMENTS

Non-renewable energy resources expended during construction and operation of facilities, greatest for Alternative 2, followed by Alternative 3, Alternatives 4 and 5, and Alternative 1.

COMPARISON OF EFFECTS ON THE SOCIAL COMPONENT OF HUMAN ENVIRONMENT
(Continued)

<u>Account Component</u>	<u>Alternative 1</u> (No Designation)	<u>Alternative 2</u> (Full Designation) 199 Miles	<u>Alternative 3</u> (186 Miles)	<u>Alternatives 4 and 5</u> (133 Miles)
<u>RIPARIAN LANDOWNER CONCERNS</u>				
Fear or perceived threat of loss of rights and/or condemnation.	No basis for fear or perceived threat.	Public may perceive as threat of condemnation and loss of rights with federal management.	Public may perceive as threat of condemnation and loss rights with federal management.	Alternative 4 - Public may perceive as threat of condemnation and loss of rights with federal management. Alternative 5 - Local management eliminates threat of condemnation, minimizes loss of landowner rights.

III. AFFECTED ENVIRONMENT

Geology-Minerals The principle geological structure within the Greenbrier River drainage is the Browns Mountain Anticline. The axis of this formation, paralleling the Greenbrier River, extends from south-west of White Sulphur Springs to northeast of Arbovale. Significant folding along the anticline is revealed by the rugged topography along the Greenbrier River.

The river corridor can be divided into five generalized lithological classifications. These are shown on the geology map, Appendix B, page A6. The first of these classifications is the Mauch-Chunk of Upper Mississippian Age. This group underlies the river corridor from its mouth at Hinton to Alderson. It is dominated by highly erosive red shales with occasional hard sandstone members. The great extent of highly erosive red shales have resulted in the development of steep side slopes along this section of the corridor.

The second lithological classification is the Greenbrier Group of Middle Mississippian Age. This Group underlies the river from Alderson to Falling Spring. The Greenbrier Group also dominates the western portion of the corridor from Falling Spring to Seebert. This area is abundant in cavernous limestone with occasional sandstone members, and minor amounts of red shale. The Greenbrier Group forms more gently rolling topography and very productive farm lands. The east side of the river corridor from Falling Spring to Seebert is shared by two geological groups, the Pocono and the Hampshire. The Pocono Group of Lower Mississippian Age is predominately sandstone with some shale. This group tends to form benches and generally less productive soils. In addition to sharing a portion of the river corridor with the Pocono Group, the Hampshire Group dominates the remainder of the river's main stem and West Fork corridor. The Hampshire Group is of Upper Devonian Age. Here lies a many layered sequence of red shale and sandstone. The last generalized lithological classification underlying the Greenbrier is the Chemung Group of Middle Devonian Age. This principle group of the East Fork is comprised of shaly siltstone and sandstone, with occasional hard sandstone members. This group tends to erode sharply explaining the steep topography of the East Fork drainage.

Except on the highest ridgetops west of Hillsboro and along the Pocahontas-Randolph County line between Durbin and the headwaters of West Fork, there are no Pennsylvanian Age coal beds in the Greenbrier watershed. Coal beds that may be present, in ascending stratigraphic order and their approximate thicknesses, are:

<u>Coal Bed</u>	<u>Thickness (Inches)</u>
Fire Creek	18 to 24
Sewell	24 to 72
Castle	Unknown
Iaegar (Hughes Ferry)	36 to 48

In Pocahontas County west of Hillsboro, the Sewell coal has been mined in the Greenbrier drainage only on Sugartree Bench Mountain at the headwaters of Spring Creek. Both surface and underground mining methods were used.

In Greenbrier County, some mining may have occurred on Buffalo Mountain west of Williamsburg. Buffalo Mountain is on the Greenbrier-Gauley drainage divide. However, streams on the Greenbrier side sink into the subsurface through limestone solution channels before reaching the river. Any acid drainage present should therefore have been neutralized.

Thin, low-quality Mississippian age coals exist in the Mauch Chunk and Pocono series. In Summers County, six Mauch Chunk coals are probably present near river level, but in Greenbrier and Pocahontas Counties only three Mauch Chunk coals are possibly present. In the latter two counties, the Mauch Chunk series occurs on ridges some distance west of the river. The Merrimac coal occurs near the top of the Pocono series and has been noted near river level at several localities between Second Creek in Greenbrier County and Marlinton, Pocahontas County. The variable thickness and low quality of both Mauch Chunk and Pocono series coal beds preclude their utilization.

Although little potential exists for oil along the Greenbrier River, there is a slight potential for gas. The southern one-third of the Gladys gas field, now used for storage, is in Pocahontas County, about one mile east of and parallel to the West Fork of the Greenbrier. Small anticlines crossing the Greenbrier River in southern Greenbrier County may provide conditions favorable for gas accumulations.

There are abundant outcrops of high-purity Greenbrier limestones in both Greenbrier and Pocahontas Counties. Currently, limestone mines and quarries are active west and southwest of Fort Springs close to the river corridor. This same limestone is also present along the river corridor both north and south of Falling Springs, Greenbrier County. There are active quarrying operations along a one and one-half mile segment of river corridor at Snowflake and Frazier, Greenbrier County.

Many units of the rocks present in the river corridor have potential as raw material for the manufacture of structural clay products. The abundance of similar materials throughout West Virginia, however, indicates that development of these resources along the Greenbrier River is doubtful. Sand and gravel is equally abundant and has no potential other than for local use.

A highly unusual geological feature occurring within the Greenbrier River drainage is the great number of caves. Within the Counties of Pocahontas, Greenbrier and Monroe, there are approximately 1,300 caves.

The ten longest caverns of West Virginia are located in Greenbrier and Pocahontas Counties. Of the State's thirty-eight caves classified as "long caves", (greater than three kilometers in length), twenty-seven are within the Greenbrier River drainage.

Cultural Resources Archaeological sites within the general area of the Greenbrier establish that the Paleo-Indian peoples, those of the earliest nomadic hunters, inhabited the river valley in small numbers. Archaic peoples, less nomadic than the Paleo-Indian, inhabited the valley from 8000 - 1000 B.P. Archaic sites have been found between Alderson and White Sulphur Springs, and between Buckeye and Marlinton. The Armstrong, composed of Adena and Hopewell peoples, lived in this area during the Middle Woodland period (1-600 A.D.). Mound sites possibly of this culture have been discovered in the Marlinton, Cloverlick, Huntersville, and Buckeye areas. During the late prehistoric period (1250 to contact) Buck Garden and Fort Ancient peoples lived along the Greenbrier.

Exploration of the Greenbrier is dated to the late 1600's. Settlement during the mid 1700's occurred near Marlinton, Alderson and Lewisburg. The French and Indian War and Dunmore's War inhibited settlement along the Greenbrier. Settlement resumed following the conclusion of Indian activity at approximately 1795.

Civil War activity within the river valley included skirmishes at Bartow, Durbin, Allegheny Mountain, Marlinton, Lewisburg, and White Sulphur Springs. The single largest battle in the Civil War for West Virginia occurred in late November, 1863, at Droop Mountain.

With the close of the Civil War, the lumber industry developed. Large log drives during the spring thaws usually ended at Ronceverte, the chief shipping and sawing center. The timber industry flourished during the early 1900's with the introduction of the Western Maryland Railroad opening the upper Greenbrier and the Chesapeake and Ohio Railroad providing transportation for the entire valley. The timber industry tumbled as the last of the virgin stands were harvested. Entire communities were abandoned as the area returned to an area of subsistence agriculture.

The Greenbrier River Valley's historical significance is exemplified by twenty-nine sites that have been selected for the National Register of Historic Places. Among these are the Droop Mountain Battlefield near Hillsboro, the Pearl Buck House in Hillsboro, and the Cass Historic District and Scenic Railroad. A complete list is located within the appendix, page A7.

Hydrology The Greenbrier River watershed covers 1,656 square miles. The average annual run-off for the watershed is from ten to twenty-five inches. Although the average monthly precipitation is relatively even throughout the year, run-off has great seasonal variations. Run-off is generally highest during winter and early spring and lowest in fall and late summer. A table beginning on page A8 shows annual peak stages and discharges at four locations along the Greenbrier. The maximum discharge recorded for the Greenbrier River is 77,500 cubic feet per second at Alderson on March 14, 1918. A summary of daily flow data for Durbin, Buckeye, Alderson, and Hilldale is shown in the table on page A13.

Annual hydrographs, pages A14-A17, show the mean monthly distribution of mean daily discharges. For example, the hydrograph for the Greenbrier at Durbin, shows that for March the mean daily flow is 570 cfs. Flow duration curves, pages A18-A21, show the percent of time a specific flow is equalled or exceeded. For example, the diagram for Durbin shows that forty percent of the time the flow of the Greenbrier River at Durbin is 200 cfs or greater. Flood frequency curves, pages A22-A25, show the probability, or return period of a specific flow. For example, the Durbin curve shows there is a ten percent chance that within any given year the Greenbrier River will have a flow of 6000 cfs at Durbin.

Water quality data used in this study has been collected by the Forest Service and the West Virginia Department of Natural Resources. A table, page A26, shows the numbers and periods of data collection. The "Guidelines for Evaluating Wild, Scenic and Recreation River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System..." states that all rivers should meet the "Aesthetics - General Criteria" as defined by the National Technical Advisory Committee on Water Quality in Federal Water Pollution Control Administration's Water Quality Criteria, April 1, 1968. The "Guidelines..." further state that "Water quality should meet the criteria for fish, other aquatic life, and wildlife, as defined in that document,...". The table on page A27, itemizes these criteria. The Greenbrier River meets minimum Wild and Scenic River Water quality criteria.

Air Quality The Clean Air Act, as amended August, 1977, changed the 1970 Act and the Environmental Protection Agency's regulations. One change was the defining of new requirements for the prevention of significant air quality deterioration. Regulations established a program for protecting areas with air quality cleaner than the national ambient air quality standards. Three incremental classes were defined in terms of the amount of deterioration to be permitted in each. Class I permits minor air quality deterioration, Class II allows moderate deterioration, and Class III permits deterioration up to secondary ambient air quality standards. The Greenbrier River study area is designated Class II. The West Virginia Air Pollution Control Commission 1979 Annual Report shows Air Quality Control Region IX, which includes the river corridor, meeting Class II requirements.

Floodplains and Wetlands Much of the river corridor is within an area subject to a one percent (100-year recurrence) or greater chance of flooding in any given year, the recognized floodplain. Executive Order 11988, Floodplain Management, gives direction in avoiding adverse impacts associated with the occupancy and modification of floodplains. Executive Order 11990, Protection of Wetlands, gives direction in avoiding destruction or modification of wetlands. This study's purpose is not specifically the evaluation of a proposed action involving construction or development which could affect a floodplain or wetland. It is recognized that the array of alternatives presented in this study could include development on wetlands or floodplains. An evaluation of effects would be necessary on a case-by-case basis for any development.

Rare and Endangered Several species of animals classified under the Endangered Species Act of 1973 are known to utilize the Greenbrier River, its adjacent slopes or fly within the river corridor at some season of the year. These are:

Indian bat (Myotis sodalis)
Virginia big-eared bat (Plecotus townsendii virginianus)
Bald eagle (Haliaeetus leuccephalus)
River otter (Lutra canadensis)
Peregrine falcon (Falco peregrinus)
Osprey (Pandion haliaetus)

Fish species considered rare by the State of West Virginia that have been proposed for classification under the Endangered Species Act of 1973 are the Eastern long-nosed darter (Exoglossum laurae), the New River shiner (Notropis scabriceps), the Kanawha minnow (Phenocobius teretulus), and the Mountain red-belly dace (Phoxinus phoxinus).

Landownership The river corridor delineated for the purpose of this study contains 47,885 acres. Of this acreage, 32,856 acres are privately owned. This represents sixty-nine percent of the river corridor area. The Monongahela National Forest administers 11,921 acres of public land within the delineated corridor, twenty-five percent of the total. Another forty-seven acres of federally administered public land lie within the river corridor as part of the National Radio Astronomy Observatory, near Green Bank. This is a negligible percent of the total corridor acreage. 3,061 acres within the delineated corridor are administered by the State of West Virginia as parks, forest, prison or railroad right-of-way, six percent of the total corridor acreage.

IV. ENVIRONMENTAL CONSEQUENCES

A. Alternatives' Effects on the Economic Component of Human Environment

Alternative 1 economic effects and conditions:

- There are 148,000 recreation visitor days projected for the year 2000 within the study corridor valued at \$458,518. There were an estimated 95,700 recreation visitor days in 1980.
- Mineral exploration and development would be restricted on 15,029 acres of National Forest and State land within the corridor. Mineral operations that ensure protection of environmental resources would be permitted. Limited mineral development is projected.
- Agriculture returns generated within the study corridor are estimated to total \$359,643 in the year 2000.
- Forest products, sawtimber and small roundwood, should generate \$167,692 within the study corridor in the year 2000.
- There is Forest Service recreation development planned that will cost an estimated \$93,975. Land and easement acquisition for Wild and Scenic River purposes are not included in this alternative. However, the existing National Forest Greenbrier River Recreation Composite lies within the study corridor. The National Forest may acquire lands on a willing seller-willing buyer basis within the portion of the study corridor covered by the composite.
- Annual operation and maintenance costs for existing and planned public recreational development in the year 2000 is estimated at \$134,300.
- This alternative has a Net Present Value of \$7,813,631 (7 5/8% i 1980\$'s).

Alternative 2 economic effects and conditions:

- There are 276,000 recreation visitor days projected for the year 2000 within the study corridor, valued at \$852,722.
- Mineral exploration and development would be restricted on 43,820 acres of public and private land within the study corridor. Mineral operations that do not detract from the character of the surrounding landscape would be permitted. Limited mineral development is projected.
- Full designation should not restrict existing or future agricultural operations. Agricultural returns within the corridor are estimated to total \$359,643 in the year 2000.

- Forest products, sawtimber and small roundwood, should generate \$111,795 within the study corridor in the year 2000.
- There would be an estimated \$35,000 needed for costs related to preparing a management plan for the river corridor.
- Recreation development, use and access sites, by the Forest Service and State, are included in this alternative at a cost of \$1,015,875. Development is intended to control use to protect the resource.
- In addition to existing National Forest and State owned sites, forty-nine acres of private land acquisition by these agencies at seventeen sites would be needed for public use and access. Estimated cost is \$166,500. Acquisition would be on a willing seller-willing buyer basis.
- Alternative 2 compliments existing and planned public development. Located along the Greenbrier River are Watoga State Park, Seneca and Calvin Price State Forests, the Greenbrier River Trail, Cass Scenic Railroad, the National Radio Observatory at Green Bank, and Forest Service Island Campground. The State and Forest Service plan future development north of Anthony. This alternative includes a substantial length of river without existing or planned public development and interests.
- Annual operations and maintenance costs for existing and planned public recreational development is estimated at \$230,700 for the year 2000.
- This alternative has a Net Present Value of \$8,320,314 (7 5/8% i, 1980\$'s).

Alternative 3 economic effects and conditions:

- There are 269,000 recreation visitor days projected for the year 2000 within the study corridor, valued at \$831,200.
- Mineral exploration and development would be restricted on 42,722 acres of public and private land within the study corridor. Mineral operations that do not detract from the character of the surrounding landscape would be permitted. Limited mineral development is projected.
- Existing and future agricultural operations should not be restricted. Agricultural returns within the corridor are estimated to total \$359,643 in the year 2000.
- Forest products, sawtimber and small roundwood should generate \$111,795 within the study corridor in the year 2000.
- There would be an estimated \$35,000 needed for costs related to preparing a management plan for the river corridor.

- Recreation development, use and access sites, by the Forest Service and State are included in this alternative at a cost of \$974,400. Development is intended to control use to protect the resource.
- In addition to existing National Forest and State owned sites, forty-nine acres of private land acquisition by the National Forest and State at seventeen sites would be needed for use and access sites. Estimated cost is \$166,500. Acquisition would be on a willing seller- willing buyer basis.
- This alternative is similar to Alternative 2 in complimenting existing and planned public development. However, there would be thirteen miles of river excluded from Wild and Scenic River System protection along which are located the State's Greenbrier River Trail, Seneca State Forest and camping facilities, and interspersed National Forest.
- Annual operations and maintenance costs for existing and planned public recreational development in the year 2000 is estimated at \$228,100.
- This alternative has a Net Present Value of \$8,327,331 (7 5/8% i, 1980\$'s).

Alternative 4 and Alternative 5 economic effects and conditions are the same, as the alternatives differ only in procedure for inclusion in the National System and in management responsibility:

- There are 238,100 recreation visitor days projected for the year 2000 within the study corridor, valued at \$736,492.
- Mineral exploration and development would be restricted on 27,866 acres of public and private land within the study corridor. Mineral operations that do not detract from the character of the surrounding landscape would be permitted. Limited mineral development is projected.
- These alternatives should not restrict existing or future agricultural operations. Agricultural returns within the corridor are estimated to total \$359,643 in the year 2000.
- Forest products, sawtimber and small roundwood, should generate \$141,069 within the study corridor in the year 2000.
- There would be an estimated \$35,000 needed for costs related to preparing a management plan for the river corridor.
- Recreation development, use and access sites, by the Forest Service and State are included in these alternatives at a cost of \$661,395. Development is intended to control use to protect the resource.

- In addition to existing National Forest and State owned sites, twenty-four acres of private land acquisition by the National Forest and State at seven sites would be needed for use and access sites. Estimated cost is \$66,500. Acquisition would be on a willing seller-willing buyer basis.
- This alternative would fully compliment existing and planned public development.
- Annual operations and maintenance costs for existing and planned public recreation development in the year 2000 is estimated at \$200,100.
- Net Present Value is \$8,091,895 (7 5/8%, 1980\$'s).

B. Alternatives' Effects on the Physical/Biological Component of Human Environment

Alternative 1 effects and conditions:

- There would be 11,900 acres of Karst geology under Forest Service or State management and protection.
- There would be 15,029 acres of National Forest and State lands on which soil erosion, sedimentation and water quality are protected.
- Fish and wildlife habitat would be protected on 15,029 acres of public land.
- Development of private lands could diminish threatened and endangered species habitat. Uncontrolled public use could disturb threatened and endangered species.
- The river corridor would continue to be designated a Class II area by the Clean Air Act.
- Sites of archaeological or historical significance would be protected on federal land. The State Caves Protection Act would protect archaeological and historical sites in all caves.
- There would be 15,029 acres of National Forest and State lands on which visual resources are protected.
- 114 miles of the Greenbrier River, the sections south of Marlinton, would continued to be protected by the West Virginia National Streams Preservation Act. This State act prohibits impoundment or water diversion that could alter this portion of the river's free-flowing condition.
- Wetlands habitat would be protected on 578 acres of federal lands by Executive Order 11990.

Alternative 2 physical/biological effects and conditions:

- There would be 36,193 acres of Karst geology under Wild and Scenic Rivers System management. These geological areas would be protected under the management plan prepared for the river corridor.
- Activities resulting in unacceptable levels of soil erosion and sedimentation would not be permitted within the entire corridor, 47,885 acres.
- The Wild and Scenic Rivers Act would legislatively require maintenance of water quality on 199 miles of river.
- Fish and wildlife habitat would be protected on 47,885 acres.
- Threatened and endangered species habitat would be protected within the entire corridor, 47,885 acres. Designation would increase public use of the area, that may disrupt threatened or endangered species. Public use would be controlled and directed to avoid disruption.
- The State could redesignate all or a portion of the 47,885 acre corridor as a Class I area by the Clean Air Act. The current Class II rating could be retained.
- Sites of archaeological or historical significance would be protected on federal land. Significant archaeological or historical sites threatened on private land would be protected. The State Caves Protection Act would protect archaeological or historical sites in all caves.
- There would be 47,885 acres on which visual resources would be protected.
- The entire Greenbrier River, 199 miles, would be maintained as a free-flowing river.
- 2508 acres of wetlands habitat on both public and private lands would be protected.

Alternative 3 effects and conditions:

- There would be 32,705 acres of Karst geology under Wild and Scenic Rivers System management. These geological areas would be protected under the management plan.
- Activities resulting in unacceptable levels of soil erosion and sedimentation would not be permitted within the corridor, on 44,397 acres.
- The Wild and Scenic Rivers Act would legislatively require maintenance of water quality on 186 miles of river.

- Fish and wildlife habitat would be protected on 44,397 acres and managed accordingly.
- Threatened and endangered species habitat would be protected within the 44,397 acre corridor. Designation would increase public use of the area that may disrupt threatened and endangered species. Public use would be controlled and directed to avoid disruption.
- The State could redesignate 44,397 acres as a Class I area by the Clean Air Act. The current Class II rating could be retained.
- Sites of archaeological or historical significance would be protected on federal land. Significant archaeological or historical sites threatened on private land would be protected. The State Caves Protection Act would protect archaeological or historical sites in all caves.
- There would be 44,397 acres on which visual resources would be protected.
- A sixty-nine mile segment and 117 mile segment of the Greenbrier would be preserved in its free-flowing condition. Between these segments are thirteen miles of river on which the free-flowing condition may be altered.
- Wetlands habitat would be protected on 2,327 acres of public and private lands.

Alternative 4 and Alternative 5 physical/biological effects and conditions are the same, as the alternatives differ only in procedure for inclusion in the National System and in management responsibility:

- There would be 19,008 acres of Karst geology under Wild and Scenic Rivers System management. These geological areas would be protected under the management plan.
- Activities resulting in unacceptable levels of soil erosion and sedimentation would not be permitted within the corridor, on 30,700 acres.
- The Wild and Scenic Rivers Act would legislatively require maintenance of water quality on 133 miles of river.
- Fish and wildlife habitat would be protected on 30,700 acres, and managed accordingly.
- Threatened and endangered species habitat would be protected within the 30,700 acre corridor. Designation would increase public use of the area that may disrupt threatened or endangered species. Public use would be controlled and directed to avoid disruption.

- The State could redesignate 30,700 acres as a Class I area by the Clean Air Act. The current Class II rating could be retained.
- Sites of archaeological or historical significance would be protected on federal land. Significant archaeological or historical sites threatened on private land would be protected. The State Caves Protection Act would protect archaeological or historical sites in all caves.
- There would be 30,700 acres on which visual resources would be protected.
- The entire Greenbrier River, 199 miles, would be maintained as a free-flowing river through combined protection of the State Streams Preservation Act and the Wild and Scenic Rivers Act.
- Wetlands habitat would be protected on 1687 acres of public and private lands.

C. Alternatives' Effects on the Social Component of Human Environment

Alternative 1 effects and conditions:

- Outdoor dispersed recreation within the river corridor for the year 2000 is projected to be fifty-five percent greater than in the year 1980. Like increases in recreation, tourism, and service industries would accompany this increase in use.
- Increased needs for local public services (law enforcement, road maintenance, medical facilities, etc.) would accompany the increase in recreational visitation in the corridor.
- New development on floodplains would be controlled on federal lands by Executive Order 11988. New development on privately owned portions of the floodplain would be uncontrolled, and subject to loss due to flooding. Water impounding or other flood protection devices could be implemented on river segments north of Knapp Creek at Marlinton. Water impounding structures below Knapp Creek would be precluded by the State Natural Streams Preservation Act.
- Water quality would be maintained and improved where necessary on 133 miles of river by Section 4 of the West Virginia Administrative Regulations, chapters 20-5 and 20-5A.
- The river corridor would continue to be classified as a Class II area by Section 162 of the Clean Air Act.
- Non-renewable energy resources would be expended during construction and operation of facilities.
- This no designation alternative would permit the continuance of existing land uses. There would be no basis for fear or perceived threat of federal involvement, including condemnation and imposed constraints.

Alternative 2 social effects and conditions:

- Outdoor dispersed recreation within the river corridor for the year 2000 is projected to be 288 percent greater than in the year 1980. Like increase in recreation, tourism, and service industries would accompany this increase in use.
- Increased needs for local public services (law enforcement, road maintenance, medical facilities, etc.) would accompany the increase in recreational visitation in the corridor.
- New development on floodplains would be controlled on federal lands by Executive Order 11988. Scenic segments would be restrictive on development, in effect preventing loss due to flooding. Development restrictions on recreational segments would be less restrictive. Water impounding flood prevention structures would be precluded by the State Natural Streams Preservation Act and Wild and Scenic Rivers System designation. Non-structural flood prevention actions and non-impounding flood prevention structures may be compatible.
- Water quality would be maintained and improved where necessary on the entire 199 miles of river by Section 4 of the West Virginia Administrative Regulations, chapters 20-5 and 20-5A. Maintenance of water quality would be protected by federal Wild and Scenic River legislation for the entire river.
- The State would have the option of reclassifying the river corridor as a Class I area, or retaining the current Class II designation under Section 162 of the Clean Air Act.
- Non-renewable energy resources would be expended during construction and operation of facilities.
- Riparian landowners may perceive federal legislation and management as threatening landowner rights, and fear acquisition by federal condemnation authority on 199 miles of river.

Alternative 3 social effects and conditions:

- Outdoor dispersed recreation within the river corridor for the year 2000 is projected to be 281 percent greater than in the year 1980. Similar increases in recreation, tourism, and service industries would accompany this increase in use.
- The need for local public services (law enforcement, road maintenance, medical facilities, etc.) would increase.

- New development on floodplains would be controlled on federal lands by Executive Order 11988. Scenic segments would be restrictive on development, in effect preventing loss due to flooding. Development restrictions on recreational segments would be less restrictive. Private lands within the thirteen mile segment not designated as part of the Wild and Scenic Rivers System would have no development restrictions. Water impounding flood protection structures would be permitted within this thirteen mile segment. Non-structural flood prevention actions and non-impounding flood prevention structures may be compatible.
- Water quality would be maintained and improved where necessary on 199 miles of river by Section 4 of the West Virginia Administrative Regulations, chapters 20-5 and 20-5A. Maintenance of water quality would be protected by federal Wild and Scenic River legislation on 186 miles of river.
- The State would have the option of retaining the Class II designation or changing to Class I under Section 162 of the Clean Air Act, on 186 miles of river corridor.
- Non-renewable energy resources would be expended during construction and operation of facilities.
- Riparian landowners may perceive federal legislation and management as threatening landowner rights. Landowners may fear acquisition by federal condemnation authority on 186 miles of river.

Alternative 4 and Alternative 5 social effects and conditions are similar, as the alternatives differ in procedure for inclusion in the National System and in management responsibility:

- Outdoor dispersed recreation within the river corridor for the year 2000 is projected to be 248 percent greater than in the year 1980. Similar increases in recreation, tourism, and service industries would accompany this increase in use.
- The need for local public services would increase.
- New development on floodplains would be controlled on federal lands by Executive Order 11988. Scenic segments would be restrictive on development, in effect preventing loss due to flooding. Development restrictions on recreational segments would be less restrictive. Private lands south of Anthony would have no development restrictions imposed by Wild and Scenic designation. Water impounding flood protection structures would be precluded on the entire river by the State Natural Streams Preservation Act and Wild and Scenic Rivers System designation. Non-structural flood prevention actions and non-impounding flood prevention structures may be compatible.

- Water quality would be maintained and improved where necessary on 133 miles of river by Section 4 of the West Virginia Administrative Regulations, chapters 20-5 and 20-5A. Maintenance of water quality would be protected by federal Wild and Scenic River legislation on 133 miles of river.
- The State would have the option of retaining the Class II designation or changing to Class I under Section 162 of the Clean Air Act, on 133 miles of river corridor.
- Non-renewable energy resources would be expended during construction and operation of facilities.
- Under Alternative 4, riparian landowners may perceive federal legislation and management as threatening landowner rights. Landowners may fear acquisition by federal condemnation authority on 133 miles of river. Under Alternative 5 this perceived threat should be less, as the basis for fear of federal land acquisition for Wild and Scenic River protection is reduced. The management plan for the river corridor would be prepared at the State or local level prior to their request for inclusion in the Wild and Scenic Rivers System. Management would be retained at the State or local level.

D. Irreversible or Irretrievable Commitment of Resources

Alternative 1 - Future unrestricted development and resource use within the river corridor could result in irreversible commitment of resources. Major development such as impoundment structure, highway construction, or surface mining should be considered irreversible over long periods of time. Less dramatic development may be reversible. There were communities established within the corridor in the early 1900's that prospered, declined, and were abandoned with nature completely reclaiming the sites. Benefits, opportunities, or outputs associated with scenic and recreational river segments may be foregone with unrestricted development and would be irretrievable for practical purposes.

Alternative 2 - Designation as a wild and scenic river will not result in irreversible commitment of resources. Legislative action can rescind designation if the needs, priorities or goals of the Nation warrant it. Benefits, opportunities or outputs associated with unrestricted development and resource use may be irretrievably lost.

Alternatives 3, 4 and 5 - Effects would be as described under Alternative 1 for non-designated segments and as described under Alternative 2 for designated segments.

V. LIST OF PREPARERS

<u>Participant</u>	<u>Area of Experience</u>	<u>Education</u>	<u>Applicable Work Experience</u> (Years)
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William Bock	Principle Study Team Member, Park Service W&S Rivers Planner	AB, Geography MA, Geography	14
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<u>Participant</u>	<u>Area of Experience</u>	<u>Education</u>	<u>Applicable Work Experience (Years)</u>
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Joe Tekel	Forest Service, Recreation Projections	BS, Forest Mgmt.	12
Linton Wright	Forest Service, Soils	BS, Plant and Soil Science	12

VI. LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
 Soil Conservation Service
 Rural Electrification Administration
 Agriculture Stabilization and Conservation Service
Department of Commerce
Department of Defense
 Army Corps of Engineers
Department of Energy
 Federal Energy Regulatory Commission
Department of Health, Education, and Welfare
Department of Housing and Urban Development
Department of Interior
 Bureau of Mines
 Fish and Wildlife Service
 Geological Survey
 National Park Service
 Office of Gas and Oil
 Office of Land Use and Water Planning
 Bureau of Land Management
Department of Transportation
 Federal Highway Administration
 Federal Railroad Administration
Environmental Protection Agency

Congressional Delegation

Senator Robert C. Byrd
Congressman Allen Mollohan
Congressman Nick J. Rahall
Senator Jennings Randolph
Congressman Harley O. Staggar, Jr.
Congressman Robert Wise

West Virginia State Agencies

Governor John D. Rockefeller
Department of Agriculture
Department of Culture and History
Department of Health
Department of Highways
Department of Mines
Department of Natural Resources
Economic and Community Development
Geological and Economic Survey
Railroad Maintenance Authority

West Virginia State Legislature

Senate Members

Robert K. Holliday
Odell H. Huffman
Fredrick Parker
Jae Spears
Larry Tucker
Ralph D. Williams

House of Delegates Members

Betty D. Crookshanks
Jack E. Holt
Paul Hutchinson
Charles F. Jordan
Sterling Lewis
Joe Martin
Sarah Lee Neal
Jack Roop
Marion Shiflet
Tony E. Whitlow
William Wooton

Other Agencies/Organizations

Acme Limestone Co.
Atlantic Richfield Co.
Blue Ridge Voyagers
The Brooks Bird Club, Inc.
Butler University, Institute of Ecology
Canoe Cruisers Association of Greater Washington, D.C.
Chessie Resources, Inc.
C&P Telephone Co.
Chessie System Railroad Co.
Davis and Elkins College
Elk River Improvement League
Fortnite Exploring and Tramping Society
Friends of the Earth
Greenbrier County Commission
Greenbrier River Hike, Bike, & Ski Trail, Inc.
Izaak Walton League of America
John Hopkins University Outdoors Club
Laurel River Club
City of Lewisburg
Marlinton Chamber of Commerce
Maryland Department of Natural Resources
Monongahela River Buffs Association
Monroe County Commission

Other Agencies/Organizations (Cont.)

Mountain Dominion Resource Conservation and
Development Area
Mountaineers for Rural Progress Council
National Audubon Society
National Association for the Advancement of
Colored People
National Wildlife Federation
New River Archaeological Society
Noranda Exploration, Inc.
Ohio Department of Natural Resources
Penn State University
Pocahontas County Commission
Potomac Highland Travel Council
Purdue University
R.B.S. Incorporated
Richwood Area Chamber of Commerce
Richwood High School
Sewell Coal Company
Sierra Club in West Virginia
Slippery Rock State College, Department of Parks
and Recreation
Summers County Chamber of Commerce
Summers County Commission
Trout Unlimited
University of Virginia, Department of Environmental Science
Westvaco Corporation
West Virginia Heritage Trust
West Virginia Native Plant Society
The Wilderness Institute - University of Montana
The Wilderness Society
Wildlife Management Institute
The Wildlife Society
W. M. Cramer Lumber Company
WV Association of Counties
WV Highlands Conservancy
WV Hills and Streams, Inc.
The WV Nature Conservancy
WV Regional Planning & Development Council, Region I
WV Regional Planning & Development Council, Region IV
WV Snowshoe Hare Association
WV Rivers Coalition
WVU, Division of Forestry
WV Wildwater Association

In addition, there is a limited supply of the statement available
for public distribution upon request to: Forest Supervisor,
Monongahela National Forest.

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GREENBRIER WILD AND SCENIC RIVER STUDY REPORT

Study Authority

The Wild and Scenic Rivers Act, Public Law 90-542, October 2, 1978, established a method for providing protection for our country's remaining free-flowing rivers that possess outstanding remarkable characteristics. The Act provides a process by which a river might be added to the Wild and Scenic Rivers System, specifies three classifications under which a river segment could be administered, and establishes the procedure for studying additional rivers that may qualify for the System. Objectives for inclusion of a river to the System are: 1) to preserve and maintain the existing resource values associated with the Nation's free-flowing rivers, and 2) to make the river and these values available to the public through managed development.

Public Law 95-625, the National Parks and Recreation Act of 1978, was signed into law on November 10, 1978. Title XI of this Act established New River and its corridor as the New River Gorge National River. In addition, Section 1108 of Title XI amended the Wild and Scenic Rivers Act by including for study the three principle tributaries of the New River. The Bluestone and the Gauley, including the tributaries of the Meadow and the Cranberry, have been designated for study under the leadership of the Department of Interior, Park Service. The Department of Agriculture, Forest Service, has been designated lead agency for study of the Greenbrier River.

The Greenbrier study includes the river area "...from its headwaters to its confluence with the New River". In addition to the mainstem, the East and West Forks are included for study as headwaters. The purpose of the study is to determine whether the Greenbrier River is eligible for inclusion to the National Wild and Scenic Rivers System. Eligible segments were to be identified and classified, followed by the formulation of a series of management alternatives for the river and its corridor. The effects of these alternatives on national economic development, environmental quality, and social well-being were to be evaluated. This evaluation precedes the identification of a preferred alternative. A management recommendation accompanies the preferred alternative. Congress may then accept, modify, or reject the preferred alternative and management recommendation.

Study Procedure

As the designated lead agency for the Greenbrier River Study, the Forest Service conducted two public involvement meetings in October, 1979. The meetings were held to announce the study and to inform the public of its procedure and how they might be involved. The request for comment initiated the task of identifying issues to be addressed by the study. A field task force was organized with the Forest Service as lead agency, and the National Park Service and West Virginia Department of Natural Resources as principle participants. Also participating are other federal, state, and local agencies, and public interest groups. Members of the field task force participated in a river evaluation float trip in May, 1980. During this trip, the field task force began to evaluate the Greenbrier for potential eligibility and segment classification. A study team, comprised of Forest Service resource specialists, began collecting data through agencies belonging to the field task force. An interagency scoping meeting was conducted in August, 1980, to further identify public issues and management concerns. The Forest Service study team reviewed and refined the issues and concerns. The study team prepared the initial alternatives in response to issues and concerns. Field task force members were asked to review these alternatives. The public had an opportunity to comment on the formulation of alternatives during additional public meetings prior to completion of the Draft Environmental Impact Statement and Study Report. The Draft EIS and Study Report presents the alternatives and recommends a preferred alternative. The field task force, Study Team, and public review and comment on the Draft EIS and Report. Written responses to the Draft Environmental Impact Statement become a formal part of the Final EIS and Report.

Location-Boundaries

The Greenbrier River is located in the East-central section of West Virginia. The study area includes those counties through which the Greenbrier flows; Pocahontas, Greenbrier, Summers and Monroe. This area and its development have an immediate effect on the Greenbrier River. In turn, designation of all or a portion of the Greenbrier to the National Wild and Scenic Rivers System would have an immediate effect on these counties. The mainstem of the Greenbrier begins in Pocahontas County at Durbin, flows through Greenbrier and Monroe Counties, and ends in Summers County at its confluence with New River at Hinton. The mainstem of the Greenbrier is 162 miles of undulating river. The East Fork of the Greenbrier, included in the study as a headwater, originates in Pocahontas County at Blister Swamp. Its flow continues through Pocahontas County for nineteen miles to Durbin where it meets the West Fork. The West Fork is recognized as the principle tributary of the Greenbrier. Its origin is in Pocahontas County above Wildell. The West Fork is eighteen miles in length from its origin as a small mountain stream to its confluence with the East Fork at Durbin. The entire length of the Greenbrier and its headwaters studied totals 199 miles.

The delineation of a river corridor, the river and its adjacent land area, gives the planner a tangible land mass to work from. This permits the comparison of alternatives by limiting the area to be effected by the proposed alternatives.

The Wild and Scenic Rivers Act limited river corridor acreages for those rivers originally included in the System. River corridor "...boundaries shall include an average of not more than three hundred and twenty acres per mile on both sides of the river...". A limitation of 320 acres per mile allows an average corridor land width of one-half mile per linear mile of river. This is an average one quarter mile of width from each bank of the river for each mile of river length. Study rivers included in the Act are not limited by a maximum acreage allowance. However, in keeping with the intent of the Act, proposals exceeding 320 acres per mile should be supported by very compelling reasons.

For the purpose of study, a river corridor has been delineated on U.S.G.S. 7.5 minute series quadrangle maps. Page size reductions of these maps are included as Appendix K, starting on page A28. The delineation of the river corridor involved several considerations. One consideration was an attempt to keep within the 320 acres per mile average. The rivers visual resource, what the user would actually see from the river, was considered. A system of computerized visual mapping using Department of Defense topographic data has been used to identify the maximum visual corridor. A professional landscape architect, using these considerations, delineated the most prominent visual scenes along the river as the corridor. This generally included the land area to the first major topographic break paralleling each side of the river. This area was adjusted throughout the river's length to include particularly sensitive vistas while excluding municipalities. The river corridor delineated is approximately 47,885 acres, averaging 240 acres per mile. It should be remembered that this corridor delineation is for study purposes only. The actual corridor would be determined during preparation of a management plan.

Eligibility Criteria and Determination

Section 2(b) of the Wild and Scenic Rivers Act establishes the criteria for determining whether a river is eligible for inclusion in the National System. Clarification and guidance concerning eligibility is provided by the "Guidelines for Evaluating Wild, Scenic and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System Under Section 2, P.L. 90-542" published by the United States Departments of Interior and Agriculture. Section 2(b) of the Act states:

"(b) A wild, scenic or recreation river area eligible to be included in the system is a free-flowing stream and the related adjacent land area that possesses one or more of the values referred to in Section 1, Subsection (b) of this Act."

These values as stated in Section 1(b) of the Act are:

"...with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values,..."

The "Guidelines for Evaluating Wild, Scenic and Recreation River Areas..." further requires that potential National Wild and Scenic Rivers System candidates:

"...be in a free-flowing natural condition, i.e., a flowing body of water or estuary or a section, portion or tributary thereof including rivers, streams, creeks, runs, kills, rills and small lakes which are without impoundment, diversion, straightening, rip-rapping or other modification of the waterway. However, low dams, diversion works, and other minor structures will not automatically preclude the river unit from being included in the National Wild and Scenic Rivers System,..."

"...be long enough to provide a meaningful experience. Generally, any unit included in the system should be at least 25 miles long."

have "...sufficient volume of water during normal years to permit, during the recreation season, full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers."

"...should be of high quality water or susceptible of restoration to that condition."

SUMMARY OF ELIGIBILITY CRITERIA

<u>Criteria</u>	<u>East Fork</u>	<u>West Fork</u>	<u>Mainstem</u>
1. Recreational Value	Yes	Yes	Yes
2. Scenic Value	Variety Class B - Common		
3. Geologic Value	No	No	Yes
4. Fish and Wildlife Value	Yes	Yes	Yes
5. Historic and Cultural Value	No	No	Yes
6. Unusual Ecosystems	Yes	Yes	Yes
7. Free-Flowing	Yes	Yes	Yes
8. Meaningful Experience			
Opportunity	Yes	Yes	Yes
9. Water Volume	Yes	Yes	Yes
10. Water Quality	Yes	Yes	Yes

1. Recreation Value. The East Fork, West Fork and mainstem of the Greenbrier have "outstandingly remarkable" recreational value due to the great variety of recreational activity. Flatwater boating - including outboard motor use, whitewater canoeing, primitive camping, developed campground camping, hiking, coldwater fishing - including stocked trout species and native brook trout, warm water fishing, hunting, photography, cross-country skiing, bicycling, horseback riding, picnicking, and spelunking are all existing recreational opportunities. This variety is complemented by several developed recreational facilities along or in close proximity to the Greenbrier that result in significant tourism. A large portion of the study area is within lands administered by the Monongahela National Forest attracting many visitors. Watoga State Park and Seneca State Forest along the Greenbrier River offer boating, swimming, camping, lodging and horseback riding. Droop Mountain Battlefield has picnicking and hiking facilities. Calvin Price State Forest offers opportunities for hunting, fishing and other dispersed recreation. The West Virginia Department of Natural Resources is developing a seventy-five mile hike and bike trail paralleling the Greenbrier River along the abandoned Chessie System Railroad right-of-way. The Cass Scenic Railroad, another State facility, climbs along the Greenbrier River to Bald Knob, the second highest peak in the State. Tourist travel the original railroad grade in rebuilt log cars pulled by Shay Steam locomotives. Another unusual attraction along the Greenbrier corridor is the National Radio Observatory in Green Bank. The West Virginia State Fair is held annually at Fairlea, within one and one-half mile of the Greenbrier. Numerous limestone caverns and rock formations are located within the Greenbrier Valley for the spelunker and rock climber. This great variety and quantity of recreational resources is surrounded by the metropolitan centers of Columbus and Cincinnati, Ohio; Baltimore, Maryland; Pittsburgh, Pennsylvania; Richmond and Roanoke, Virginia; and Washington, D.C. The Greenbrier River is ideally located to help satisfy the growing recreational demand of the Middle Atlantic Region as it is within one day's drive to one-fourth of the population of the United States.

2. Scenic Values. The East Fork, West Fork and mainstem of the Greenbrier River are all esthetically pleasing and characteristic of the scenic beauty for which West Virginia is noted. However, the river corridor should not be called "outstandingly remarkable" in scenic quality in comparison to other similar streams. Evaluation of scenic qualities using the National Forest Visual Management System concluded that landform, rockform, vegetation and water bodies of the Greenbrier are predominantly Variety Class B, Common. This variety class is typified by gently rolling ridgetops and steep walls. Rockforms are obvious. Vegetation is characterized by hardwood side slopes in continuous cover with some pattern, a common diversity of species, and farms in use.
3. Geologic Value. Three counties through which the Greenbrier flows (Pocahontas, Greenbrier and Monroe) are noted for their cavernous limestone. Over sixty percent of the known caves of West Virginia are within these counties. Within one-half mile of the Greenbrier are not less than a dozen cave systems, many with a significant or unusual characteristic. The mainstem of the Greenbrier River, with its associated great number of caves located in the Greenbrier geologic formation, is determined to be geologically "outstandingly remarkable".
4. Fish and Wildlife Values. A great variety and abundance of wildlife and fish species inhabit the Greenbrier River Valley. This is not uncommon to similar rivers and streams in this area. There are however, self-supporting populations of several species classified under the Endangered Species Act of 1973, which utilize the river corridor. These include the Indiana bat, Virginia big-eared bat, bald eagle, river otter, peregrine falcon, and osprey. The West Virginia Department of Natural Resources has listed several fish species inhabiting the Greenbrier River as rare. These species (the Eastern tongue-tied minnow, New River shiner, Kanawha minnow, and mountain red-belly dace) are not currently listed, but have been proposed for classification under the Endangered Species Act. This variety of mammals, birds and fish classified or having potential for classification under the Endangered Species Act identifies the Greenbrier corridor as "outstandingly remarkable" in fish and wildlife value.
5. Historic and Cultural Values. The Greenbrier River Valley is rich in history. There are twenty-nine sites nominated to the National Register of Historic Places along the mainstem. This qualifies the mainstem as "outstandingly remarkable" historically. These sites are identified in the Appendix, page A7.
6. Unusual Ecosystems. Two unusual ecosystems occur along the Greenbrier River, Blister Swamp and the Greenbrier limestone belt. Blister Swamp is unusual in that it is the second most southern stand of naturally occurring balsam fir, Abies balsamea, in the United States. There are also several unusual plant species here that are rare or have a limited range.

The Karst topography of the Greenbrier limestone belt contains numerous caverns and sinks. Beginning at the head of the West Fork, the belt outcropping parallels the west bank of the Greenbrier, becoming several miles wide in Greenbrier County. Wildlife almost unique to limestone caverns include the cave salamander (Eurycea lucifuga), Indiana bat (Myotis sodalis) and the Virginia big-eared bat (Plecotus townsendii virginianus). Other bat species, opossum, raccoon, fox and the wood rat also inhabit these caves.

7. Free-Flowing. A low dam located on the East Fork at Frank, West Virginia, is the only impoundment structure completely crossing the Greenbrier within the study area. A slack water pool is not discernible and this structure is of minor significance. Low water bridges located at Abes Run and Watoga do not impound and are not significant. Therefore, the East and West Forks, and the mainstem of the Greenbrier are considered free-flowing throughout.
8. Meaningful Experience Opportunity. The entire Greenbrier River is a continuous free-flowing river totalling 199 miles in length. The "Guidelines ...suggest a river unit should be twenty-five miles in length to provide a meaningful experience". The Greenbrier's unusual long length obviously provides a meaningful experience opportunity.
9. Water Volume. Hydrological data presented in the appendix of this report shows that the Greenbrier River has experienced both floods and extremely low flows. This same data shows that the Greenbrier River does have a sufficient volume of water to permit full enjoyment of water-related outdoor recreation activities. The Greenbrier River is recognized by the public as a principle river of southeastern West Virginia offering these recreational opportunities.
10. Water Quality. Water quality of the Greenbrier River has been evaluated using the "Aesthetics - General Criteria" as defined by the National Technical Advisory Committee on Water Quality in the Federal Water Pollution Control Administration's Water Quality Criteria, April 1, 1968. This evaluation, Appendix J, shows the Greenbrier River to be of sufficiently high water quality for eligibility to the National Wild and Scenic Rivers System.

Classification Criteria and Determination

Section 2(b) of the National Wild and Scenic Rivers Act states that rivers eligible for inclusion in the system shall be classified as:

"(1) Wild river areas... Those rivers or section of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. There represent vestiges of primitive America."

These criteria are interpreted by the "Guidelines..." as follows:

- a. "Free of impoundments." Wild river areas shall be generally free of impoundments. Section 15 of the Act provides for exceptions to the rule that all rivers included in the system must be entirely free-flowing. The existence of a few unobtrusive low dams, diversion works, and other minor structures may be considered amenities and will not preclude wild classification if such structures are sufficiently small in size and few in number that they meet the "essentially primitive" criterion described under 'c' below.
- b. "Generally inaccessible except by trail". Wild river areas will not generally contain roads, railroads, or other provisions for overland travel within the river corridor. However, the existence of a few inconspicuous roads leading to the boundary of the river area will not necessarily bar wild river classification.
- c. "Watersheds or shorelines essentially primitive". Wild river areas will show little or no evidence of man's intrusion. Shorelines and watersheds within the boundaries should be essentially free of structures and other evidence of human activity such as buildings, pipelines, powerlines, dams, pumps, generators, diversion works, rip-rap and other modifications of the waterway or adjacent land within the river corridor. A few inconspicuous structures, however, need not necessarily bar wild classification.

Historic or cultural structures shall be taken as positive values of river area rather than intrusions. A limited amount of domestic livestock grazing or hay production may be considered "essentially primitive". There should be no on-going timber harvest and the river area should show little or no evidence of past logging activities.

- d. "Waters unpolluted". The water quality of a wild river will meet Federal Criteria or federally approved State standards for aesthetics, for propagation of fish and wildlife normally adapted to the habitat of the stream, and for primary contact recreation except where exceeded by natural conditions.

"(2) Scenic river areas... Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads."

The "Guidelines..." interprets:

- a. "Free of impoundments." Scenic river areas will be generally free of impoundments. The rationale for allowing exceptions under the wild classification also applies to the scenic classification. Impoundments and other modifications of the waterway need not necessarily bar scenic classification. However, in the case of scenic river areas, somewhat greater latitude is allowed. Low dams, diversion works, and other minor structures will not preclude scenic

classification if such structures are sufficiently small in size and few in number that they meet the criteria of "still largely primitive" and "largely undeveloped" described under 'b' below.

- b. "Shorelines or watershed still largely primitive and shorelines largely undeveloped." To qualify for scenic classification, the river segment shorelines and immediate environment should not show substantial evidence of man's intrusion. The portion of the watershed within the boundaries of the scenic river area may have some discernible existing development. Some diversion, straightening, rip-rapping, or other modification of the waterway will not preclude a river from being considered for scenic classification. Row crops not requiring highly mechanized or intensive agricultural techniques will be considered as meeting the test of "largely primitive", as will on-going selective timber harvest if it is accompanied without disturbing the naturalness of the forest as viewed from the river bank. "Largely undeveloped" means that small rural communities or concentrations of habitations must be limited to relatively short reaches of the segment and that individual dwellings or farms should be well dispersed. Buildings of historic or cultural value will be taken as positive features of the river area rather than intrusion.
- c. "Accessible in places by roads." Roads or railroads may occasionally reach or bridge the river. Scenic river areas will not include long stretches of conspicuous and well-travelled roads closely paralleling the river bank. The presence, however, of a parallel road or railroad will not necessarily preclude scenic river designation provided it is lightly travelled.

"(3) Recreational river areas... Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

These criteria are interpreted by the "Guidelines..." as follows:

- a. "Readily accessible by road or railroad." There may be parallel roads or railroads in close proximity to one or both banks of the river as well as bridge crossing and river access points.
- b. "Some development along their shorelines." Lands may have been developed for all but the most intensive agricultural uses, may show evidence of past and on-going timber harvest, and may include substantial residential development as well as a limited amount of commercial or light industrial development."
- c. "Some impoundment or diversion in the past." There may be some existing impoundments, diversions or other modification of the waterway having an impact on the river area greater than that described for the wild and scenic categories. Existing dams, diversion works, rip-rap and other structures will not bar recreational classification, provided the waterway remains generally natural and riverine in appearance.

The "Guidelines..." further instructs the participants and observers of a wild and scenic river study that:

"It is important to understand each criterion, but it is more important to understand their collective intent. Each river segment and its immediate environment should be considered as a unit. The basis for classification is the degree of naturalness, or stated negatively, the degree of evidence of man's intrusion in the river area. The most natural rivers will be classified wild; those somewhat less natural, scenic; and those least natural (or most developed), recreational.

Despite apparent similarities, a wild river area is not equivalent to a wilderness area, a scenic river area does not necessarily provide a sightseeing experience, and a recreational river does not necessarily possess high recreational use or potential.

Only conditions within the study corridor are relevant for classification. Thus, river segments which pass through highly developed areas, but meet the criteria within the study corridor will qualify for designation as components of the national system.

For the purpose of classification, a river area may be divided into segments. Each segment, considered as a whole, will conform to one of the classifications. In segmenting the river the study team should take into account the management strategies necessary to administer the entire river area.

Although each classification permits certain existing development, the criteria do not imply that additional development is permitted in the future. The basic management objective for any component of the system, whether classified wild, scenic or recreational, is to maintain the river area in the same condition as when studied, or to enhance its condition.

Finally, the classification criteria provide uniform guidance for professional judgement, but they are not absolutes. It is not possible to formulate criteria so as to mechanically or automatically classify river areas."

River segments meeting eligibility requirements for inclusion in the National Wild and Scenic River System are shown on the map - ALTERNATIVE 2, FULL DESIGNATION, page A13. These segments are:

SEGMENT A (Scenic Classification) - that portion of the East Fork of the Greenbrier River from its origin at Blister Swamp to Forest Service Road 36, entering Forest Service Island Campground. Segment length is ten miles. This segment meets "wild" classification with the exception of accessibility. The segment can be reached by a jeep trail crossing private ownership at the river's origin. The trail then parallels the East Fork for two miles to National Forest ownership and a locked gate. The trail has not been used frequently, but does exist. Forest Service Road 254 crosses the river at The Pigs Ear. This unpaved road is used for access to the East Fork Hiking Trail. A third access point in this segment is an unimproved campground where Abes Run meets the East Fork.

This can be reached by Forest Service Road 51, Abes Run Road. The East Fork Hiking Trail, designed for foot travel only, continues south, paralleling the river to Island Campground. Here the East Fork is accessible by Forest Service Road 36. This segment of the East Fork is free of impoundments, essentially primitive and has waters unpolluted. It is, however, accessible in places by roads and, therefore, classified as a scenic river segment.

SEGMENT B (Recreational Classification) - that portion of the East Fork of the Greenbrier River from Island Campground to its confluence with the West Fork of the Greenbrier at Durbin. Segment length is nine miles. A small dam on this segment located at Frank is not significant as there is not a discernible slack water pool. The segment has scenic attributes. However, roads flank both sides of the river for most of this segment. One of these roads, U.S. Route 250, is well travelled and a major throughway for this section of the State. There is an active railroad paralleling the East Fork between the communities of Bartow and Durbin. This segment is characterized by easy accessibility and residential and light industrial development. It is classified as a recreational river segment.

SEGMENT C (Recreational Classification) - the entire West Fork of the Greenbrier River from its origin at Wildell to its confluence with the East Fork of the Greenbrier at Durbin. Segment length is eighteen miles. This segment meets wild classification with the exception of accessibility. The entire segment is closely paralleled by the commercially used Western Maryland Railroad and Forest Service Road 44. This segment is free of impoundments, is essentially primitive and has waters unpolluted. It is, however, readily accessible by road and railroad, and therefore classified as a recreational river segment.

SEGMENT D (Scenic Classification) - that portion of the mainstem of the Greenbrier River from the confluence of the East and West Forks at Durbin to the Interstate Route 64 bridge at Caldwell. Segment length is 109 miles. This segment is paralleled by the Chessie System Railroad from Durbin, south to two miles south of Cass. This section of railroad has been acquired by the State as an extension of the Cass Scenic Railroad and is intended for overflow tourism and maintenance related train travel only. The Chessie System Railroad from two miles south of Cass to Caldwell has been abandoned and the tracks pulled. This section, closed to motored vehicles, is managed by the West Virginia Department of Natural Resources as the Greenbrier River Trail. Roads occasionally bridge or ford this segment. There is a breeched low water bridge crossing at Watoga, however this section is free of impoundments. Shorelines are largely primitive. Long stretches of forested shorelines are broken by farms. The rural communities of Cass, Stony Bottom, Clover Lick, Marlinton, Seebert, Denmar, Falling Spring, and Anthony are along this segment of the Greenbrier. These communities are well dispersed along the segment and of minor influence as their river frontages are not long. Segment D is free of impoundments, has shorelines largely undeveloped, is accessible in places by roads and therefore classified scenic.

SEGMENT E (Recreational Classification) - that portion of the mainstem of the Greenbrier River from the Interstate Route 64 bridge at Caldwell to its confluence with New River at Hinton. Segment length is fifty-three miles. The Greenbrier takes on an obviously different character below the I-64 bridge. A commercial line of the Chessie System Railroad parallels this segment of the Greenbrier for its entire length. Accessibility by road is noticeably increased over Segment D. The communities of Ronceverte, Alderson, and Talcott along this segment are larger communities than those along Segment D. Summer homes and fishing camps are common. Segment E is free of impoundments, has some development along the shoreline including substantial residential and limited commercial development, and is readily accessible by road and railroad. Segment E is classified as recreational.

Proposed Management Guidelines

Guidelines for the study of potential national wild and scenic rivers and management of designated rivers were first issued jointly by the Department of Agriculture and the Department of the Interior in 1970, and were revised in September, 1982. A management plan for a river proposed for inclusion in the Wild and Scenic Rivers System would adhere to the management guidelines in Section III - Management of the National Wild and Scenic Rivers System; Final Revised Guidelines for Eligibility, Classification and Management of River Areas (published in the Federal Register Tuesday, September 7, 1983).

These Guidelines are applicable to all of the alternatives identified in the draft environmental impact statement that propose inclusion of river segments in the Wild and Scenic Rivers System.

This should not be construed as being the final management plan. The Forest Service, if appointed managing agency, would follow these guidelines preparing the management plan and administering the river. These guidelines would be recommended for use, if State-local administration results.

Management principles would be implemented within the river area boundary defined by the management plan. The Final Revised Guidelines would be followed to the fullest extent possible under the managing board's or commission's general statutory authorities and other existing Federal, State, and local laws, including zoning ordinances where applicable.

Some management principles would apply only to public lands within the river area. For example, the Wild and Scenic Rivers Act does not open private lands to public recreation. Management principles would apply to private lands only to the extent required by other laws such as local zoning and air and water pollution regulations.

The Final Revised Guidelines follow. Suggested local guidelines that respond to the Final Revised Guidelines and would be applicable to the Greenbrier River follow and are indented.

Section III - Management

Wild and scenic rivers shall be managed with plans prepared in accordance with the requirements of the Act, other applicable laws, and the following general management principles. Management plans will state: General principles for any land acquisition which may be necessary; the kinds and amounts of public use which the river area can sustain without impact to the values for which it was designated; and specific management measures which will be used to implement the management objectives for each of the various river segments and protect esthetic, scenic, historic, archeologic and scientific features.

If the classification or classifications determined in the management plan differ from those stated in the study report, the management plan will describe the changes in the existing condition of the river area or other considerations which required the change in classification.

General Management Principles

Section 10(a) states,

Each component of the national wild and scenic river system shall be administered in such a manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its esthetic, scenic, historic, archeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development on the special attributes of the area.

This section is interpreted as stating a nondegradation and enhancement policy for all designated river area, regardless of classification. Each component will be managed to protect and enhance the values for which the river was designated, while providing for public recreation and resource uses which do not adversely impact or degrade those values. Specific management strategies will vary according to classification but will always be designed to protect and enhance the values of the river area. Land uses and developments on private lands within the river area which were in existence when the river was designated may be permitted to continue. New land uses must be evaluated for their compatibility with purposes of the Act.

The management principles which follow stem from section 10(a). Managing agencies will implement these principles to the fullest extent possible under their general statutory authorities and existing Federal, State and local laws. Because of these limitations, however, implementation of the principles may differ among and within components of the system depending on whether the land areas involved are federally, State, locally or privately owned.

Carrying Capacity. Studies will be made during preparation of the management plan and periodically thereafter to determine the quantity and mixture of recreation and other public use which can be permitted without adverse impact on the resource values of the river area. Management of the river area can then be planned accordingly.

Greenbrier Scenic and Recreational River segments - watercraft use will be limited to a level which will protect river values, reduce user conflict and provide satisfying recreation experiences. Controls on numbers, timing and/or location other river users may also be necessary.

Public Use and Access. Public use will be regulated and distributed where necessary to protect and enhance (by allowing natural recovery where resources have been damaged) the resource values of the river area. Public use may be controlled by limiting access to the river, by issuing permits, or by other means available to the managing agency through its general statutory authorities.

Camping would be permitted at designated camping areas in Greenbrier Scenic and and Recreational river segments. Foot access trails for anglers and hiking would be provided where needed and would be consistent with fisheries management, streambank protection and other programs. Selected vehicle access sites would be improved but no new vehicle access sites would be provided.

Basic Facilities. The managing agency may provide basic facilities to absorb user impacts on the resource. Wild river areas will contain only the basic minimum facilities in keeping with the "essentially primitive" nature of the area. If facilities such as toilets and refuse containers are necessary, they will generally be located at access points or at a sufficient distance from the river bank to minimize their intrusive impact. In scenic and recreational river areas, simple comfort and convenience facilities such as toilets, shelters, fireplaces, picnic tables and refuse containers are appropriate. These, when placed within the river area, will be judiciously located to protect the values of popular areas from the impacts of public use.

Picnicking and canoe launch facilities would be provided at river access sites in Greenbrier Scenic and Recreational river segments.

Major Facilities. Major public use facilities such as developed campgrounds, major visitor centers and administrative headquarters will, where feasible, be located outside the river area. If such facilities are necessary to provide for public use and/or to protect the river resource, and location outside the river area is infeasible, such facilities may be located within the river area provided they do not have an adverse effect on the values for which the river area was designated.

Greenbrier Scenic and Recreational river segments - the number of camping facilities will be directly related to demand, but not to exceed the carrying capacity of the river corridor.

Motorized Travel. Motorized travel on land or water is generally permitted in wild, scenic and recreational river areas, but will be restricted or prohibited where necessary to protect the values for which the river area was designated.

Motorized watercraft would be permitted on Green-brier Scenic and Recreational river segments.

Motorized land vehicles would be prohibited in the river management zone except on developed public roads, for owner access on private land, and in conjunction with resource management and protection activities, agricultural and emergency use.

Agricultural and Forestry Practices. Agricultural and forestry practices should be similar in nature and intensity to those present in the area at the time of designation. Generally, uses more intensive than grazing and hay production are incompatible with wild river classification. Rowcrop production and timber harvest may be practiced in recreational and scenic river areas. Recreational river areas may contain an even larger range of agricultural and forestry uses. Timber harvest in any river area will be conducted so as to avoid adverse impacts on the river area values.

Other Resource Management Practices. Resource management practices will be limited to those which are necessary for protection, conservation, rehabilitation or enhancement of river area resources. Such features as trail bridges, fences, water bars and drainage ditches, flow measurement devices and other minor structures or management practices are permitted when compatible with the classification of the river area and provided that the area remains natural in appearance and the practices or structures harmonize with the surrounding environment.

Water Quality. Consistent with the Clean Water Act, water quality in wild, scenic and recreational river areas will be maintained or, where necessary, improved to levels which meet Federal criteria or federally approved State standards for aesthetics and fish and wildlife propagation. River managers will work with local authorities to abate activities within the river area which are degrading or would degrade existing water quality.

Additional management principles stem from other sections of the Act as follows:

Land Acquisition: Section 6 (Pertains to acquisition within a Federally managed river area. The action proposed by this study includes management at the State or local level. Acquisition would be on a willing seller willing buyer basis).

Water Resource Development: Section 7 (Precludes the construction of any dam, water conduit, reservoir, powerhouse, transmission line, or other project that would have a direct and adverse affect on the river values for which the river was designated).

Mining: Section 9

Section 9(a). Nothing in this Act shall affect the applicability of the United States mining and mineral leasing laws within components of the national wild and scenic rivers system except that ----

(i) all prospecting, mining operations, and other activities on mining claims which, in the case of a component of the system designated in section 3 of this Act, have not heretofore been perfected or which, in the case of a component hereafter designated pursuant to this Act or any other Act of Congress, are not perfected before its inclusion in the system and all mining operations and other activities under a mineral lease, license, or permit issued or renewed after inclusion of a component in the system shall be subject to such regulations as the Secretary of the Interior or, in the case of national forest lands, the Secretary of Agriculture may prescribe to effectuate the purposes of this Act;

(ii) subject to valid existing rights, the perfection of, or issuance of a patent to, any mining claim affecting lands within the system shall confer or convey a right or title only to the mineral deposits and such rights only to the use of the surface and the surface resources as are reasonably required to carrying on prospecting or mining operations and are consistent with such regulations as may be prescribed by the Secretary of the Interior or, in the case of national forest lands, by the Secretary of Agriculture; and

(iii) subject to valid existing rights, the minerals in Federal lands which are part of the system and constitute the bed or bank or are situated within one-quarter mile of the bank of any river designated a wild river under this Act or any subsequent Act are hereby withdrawn from all forms of appropriation under the mining laws and from operation of the mineral leasing laws including, in both cases, amendments thereto.

Regulations issued pursuant to paragraphs (i) and (ii) of this subsection shall, among other things, provide safeguards against pollution of the river involved and unnecessary impairment of the scenery within the component in question.

Section 9 (b). The minerals in any Federal lands which constitute the bed or bank or are situated within one-quarter mile of the bank of any river which is listed in section 5, subsection (a) of this Act are hereby withdrawn from all forms of appropriation under the mining laws during the periods specified in section 7, subsection (b) of this Act. Nothing contained in this subsection shall be construed to forbid prospecting or the issuance of leases, licenses, and permits under the mineral leasing laws subject to such conditions as the Secretary of the Interior and, in the case of national forest lands, the Secretary of Agriculture find appropriate to safeguard the area in the event it is subsequently included in the system.

Management of Adjacent Federal Lands: Section 12(a)

Section 12(a). The Secretary of the Interior, the Secretary of Agriculture and the head of any other Federal department or agency having jurisdiction over any lands which include, border upon, or are adjacent to, any river included within the National Wild and Scenic Rivers System or under consideration for such inclusion, in accordance with section 2(a) (ii), 3(a), or 5(a), shall take such action respecting management policies, regulations, contracts, plans, affecting such lands, following the date of enactment of this sentence, as may be necessary to protect such rivers in accordance with the purposes of this Act. Such Secretary or other department or agency head shall, where appropriate, enter into written cooperative agreements with the appropriate State or local official for the planning, administration, and management of Federal lands which are within the boundaries of any rivers for which approval has been granted under section 2(a) (ii). Particular attention shall be given to scheduled timber harvesting, road construction, and similar activities which might be contrary to the purposes of this Act.

Section 12(b). Nothing in this section shall be construed to abrogate any existing rights, privileges, or contracts affecting Federal lands held by any private party without the consent of said party.

Hunting and Fishing: Section 13(a)

Water Rights: Section 13(b)-(f)

Rights-of-Way: Section 13(g)

Section 13(a). Nothing in this Act shall affect the jurisdiction or responsibilities of the States with respect to fish and wildlife. Hunting and fishing shall be permitted on lands and waters administered as parts of the system under applicable State and Federal laws and regulations unless, in the case of hunting, those lands or waters are within a national park or monument. The administering Secretary may, however, designate zones where, and establish periods when, no hunting is permitted for reasons of public safety, administration, or public use and enjoyment and shall issue appropriate regulations after consultation with the wildlife agency of the State or States affected.

Emphasis would be given to management that protects existing fish and wildlife values, including rare and endangered species. Habitat enhancement measures would be encouraged when necessary for protection of existing species within the Greenbrier corridor.

Section 13(b). The jurisdiction of the States and the United States over waters of any stream included in a national wild, scenic, or recreational river area shall be determined by established principles of law. Under the provisions of this Act, any taking by the United States of a water right which is vested under either State or Federal law at the time such river is included in the

national wild and scenic rivers system shall entitle the owner thereof to just compensation. Nothing in this Act shall constitute an express or implied claim or denial on the part of the Federal Government as to exemption from State water laws.

Section 13(c). Designation of any stream or portion thereof as a national wild, scenic or recreational river area shall not be construed as a reservation of the waters of such streams for purposes other than those specified in this Act, or in quantities greater than necessary to accomplish these purposes.

Section 13(d). The jurisdiction of the States over waters of any stream included in a national wild, scenic or recreational river area shall be unaffected by this Act to the extent that such jurisdiction may be exercised without impairing the purposes of this Act or its administration.

Section 13(e). Nothing contained in this Act shall be construed to alter, amend, repeal, interpret, modify, or be in conflict with any interstate compact made by any States which contain any portion of the national wild and scenic rivers system.

Section 13(f). Nothing in this Act shall affect existing rights of any State, including the right of access, with respect to the beds of navigable streams, tributaries, or rivers (or segments thereof) located in a national wild, scenic or recreational river area.

Section 13(g). The Secretary of the Interior or the Secretary of Agriculture, as the case may be, may grant easements and rights-of-way upon, over, under, across, or through any component of the national wild and scenic rivers system in accordance with the laws applicable to the national park system and the national forest system, respectively: Provided, That any conditions precedent to granting such easements and rights-of-way shall be related to the policy and purpose of this Act.

Greenbrier Scenic Recreational river segments -
new utility lines would be permitted, providing
existing routes were utilized or that new routes
meet visual quality standards for underground
lines.

The following policies are consistent with and supplement the management principles state in the Act:

Land Use Controls. Existing patterns of land use and ownership should be maintained, provided they remain consistent with the purposes of the Act. Where land use controls are necessary to protect river area values, the managing agency will utilize a full range of land-use control measures including zoning, easements and fee acquisition.

Greenbrier Scenic and Recreational river segments -
in Scenic segments new structures would not be per-
mitted within the seen area, other than those
associated with existing structures. Construction

of new residences and other buildings would be permitted outside the seen area. In Recreational segments of the Greenbrier, new structures would be permitted. Owners would be encouraged to screen new structures within the seen area with natural vegetation and to use harmonious colors. Advertising signs would not be permitted within the seen area of the river in either Scenic or Recreational segments. Signs providing direction, interpretation of special interest areas, safety, and regulation of use would be permitted.

Rights-of-Way. In the absence of reasonable alternative routes, new public utility rights-of-way on Federal lands affecting a Wild and Scenic River area or study area will be permitted. Where new rights-of-way are unavoidable, locations and construction techniques will be selected to minimize adverse effects on scenic, recreational, fish and wildlife and other values of the river area.

Other legislation applicable to the various managing agencies may also apply to wild and scenic river areas. Where conflicts exist between the provisions of the Wild and Scenic Rivers Act and other acts applicable to lands within the system, the more restrictive provisions providing for protection of the river values shall apply.

APPENDICIES TO
ENVIRONMENTAL IMPACT STATEMENT
AND
STUDY REPORT

Appendix A

PUBLIC INVOLVEMENT

The National Forest, as designated lead agency, planned for public involvement in the Greenbrier River Wild and Scenic River Study. Goals of the public involvement process were:

1. To inform the public about the Wild and Scenic Rivers System, the Greenbrier River study, and subsequent decisions;
2. To encourage public understanding of and participation in the planning and decision process;
3. To be responsive to public concerns and to evaluate how decisions will affect the public;
4. To assist in the study by broadening the information base upon which decisions are made.

The following public involvement activities have occurred:

August 1979 - Representatives of the National Forest, National Park Service, Heritage Conservation and Recreation Service, West Virginia Department of Natural Resources, and the Governor's Office of Economic and Community Development met in Philadelphia, Pennsylvania to coordinate wild and scenic river studies in West Virginia. Public information meetings were scheduled.

September 1979 - The Forest Service prepared a press release announcing the river studies in West Virginia and the public information meetings schedule.

October 1979 - The Forest Service conducted public information meetings at Lewisburg and Marlinton, West Virginia to announce the Greenbrier River study, to gather public issues, and to request the public's participation in the study. Approximately 100 people attended. Representatives of the Boy Scouts of America, Corps of Engineers, Coalition to Save New River, Forest Service, Greenbrier River Hike, Bike, and Ski Trail Inc., Greenbrier Travel Council, Izaak Walton League of America, West Virginia Department of Natural Resources, West Virginia Highlands Conservancy, local industry, landowners, and other interested public also attended.

May 1980 - The Forest Service conducted a seven day Greenbrier River evaluation trip to become familiar with the study area and to determine if the river met eligibility requirements. Twenty-five people participated including study team members representing the National Park Service, Ohio River Basin Commission, West Virginia Department of Natural Resources, and Forest Service. Special interest groups representing the Izaak Walton League of America and Save Our Mountains participated. Newspaper and radio media participated in and covered the event.

August 1980 - A Notice of Intent to prepare an Environmental Impact Statement and Study Report for the Greenbrier Wild and Scenic River Study was published in the Federal Register.

August 1980 - The Forest Service conducted an inter-agency scoping meeting in Charleston, West Virginia. The meeting was held to surface issues and concerns and to coordinate the Greenbrier study with other agencies' planning or studies. Approximately 30 people attended including study team members representing the Corps of Engineers, Fish and Wildlife Service, Forest Service, Governor's Office of Economic and Community Development, National Park Service, Ohio River Basin Commission, Soil Conservation Service, and the West Virginia Department of Natural Resources.

October 1980 - Wonderful West Virginia, the state magazine published by the Department of Natural Resources, contained an article written by the Forest Service about the Greenbrier River and the study. The article encouraged public participation and comment.

November 1980 - The Forest Service requested a review of the preliminary alternatives by study team members.

December 1980 - The Forest Service met in Philadelphia, Pennsylvania with representatives of the Corps of Engineers, National Park Service, and West Virginia Department of Natural Resources. The purpose of the meeting was to coordinate wild and scenic river studies in West Virginia with studies proposed by the Corps of Engineers.

March 1981 - West Virginia Department of Natural Resources presented a talk show about the Greenbrier River study. The show, broadcast through a Charleston, West Virginia television network, requested public comment and participation in the study.

June 1981 - The Forest Service prepared a press release announcing the preliminary findings and alternatives, as well as a schedule of public participation meetings.

June 1981 - The Forest Service prepared a newsletter presenting the preliminary findings and alternatives. The newsletter requested the public's attendance and participation in the scheduled public meetings. The newsletter was distributed to individuals on the Greenbrier River study contact list, about 700 in number.

June 1981 - The Forest Service placed notice of the public meetings in newspapers with distribution covering the counties involved in the study.

July 1981 - The Forest Service participated in a radio broadcast serving the study area in which the public commented and asked questions of the Forest Service about the Greenbrier River study. The Forest Service encouraged public attendance and participation in the public meetings.

July 1981 - The Forest Service conducted in-house meetings on Ranger Districts within the study area. A status report on the study was presented to enable District personnel to better handle inquiries made at the District level concerning the river study.

July 1981 - The Forest Service conducted public participation meetings at Marlinton, White Sulphur Springs, and Hinton, West Virginia. The findings and alternatives were presented. Approximately 160 people attended. Attending were representatives of the Boy Scouts of America, Corps of Engineers, Farm Bureau, Forest Service, Greenbrier Historical Society, Greenbrier River Hike, Bike and Ski Trail Inc., Highlands Conservancy, Izaak Walton League of America, National Park Service, Save Our Mountains, West Virginia Citizens Action Group, West Virginia Department of Natural Resources, West Virginia Highlands Conservancy, West Virginia Hills and Streams, West Virginia Rivers Coalition, local industry, landowners, and other interested public.

July 1981 - The Forest Service participated in a meeting called by the Pocahontas County Citizens Association to discuss the Greenbrier River study. Approximately 70 people attended, predominately representing landowner interests.

July 1981 - The Forest Service made a presentation to the Marlinton Lions Club about the study. Approximately 25 people attended.

September 1981 - The Forest Service made a presentation to the White Sulphur Springs Kiwanis Club about the study. Approximately 60 people attended.

November 1981 - The Forest Service conducted a meeting in Renick, West Virginia for officials of those counties covered by the study. The purposes of the meetings were to explain how Wild and Scenic designation could affect the counties, what their possible roles with different management schemes would be, and to clarify their position on alternatives. Representatives of the West Virginia Department of Natural Resources, West Virginia Hills and Streams, and landowners also participated.

December 1981 - The National Park Service conducted public participation meetings at Princeton, Pipestem, and Hinton, West Virginia to present their findings and alternatives for the Bluestone and Gauley River Studies. The Forest Service participating as a study team member and as lead agency for the Greenbrier study. The Forest Service commented on and answered questions pertaining to the Greenbrier study. Approximately 75 people attended.

Throughout the study the public has been encouraged to participate and comment. Prior to completion of the Draft Environmental Impact Statement, the Forest Service has received over 100 letters expressing concerns, offering suggestions, and asking questions about the Greenbrier Wild and Scenic River study. These letters have been extremely helpful in preparation of the Draft Environmental Impact Statement.

Appendix C

Sites Listed on the National Register of Historic Places

Droop Mountain Battlefield near Hillsboro
Pearl Buck House in Hillsboro
Reber Radio Telescope in Green Bank
Cass Scenic Railroad in Cass
Frank and Anna Hunter House in Marlinton
Pocahontas Times Print Shop in Marlinton
Huntersville Presbyterian Church in Huntersville
Marlinton Chesapeake and Ohio Railroad Station in Marlinton
Greenbrier County Library and Museum in Lewisburg
Old Stone Church (Presbyterian) in Lewisburg
Colonel John Stuart House (Stuart Manor) near Lewisburg
Greenbrier County Court House and Lewis Spring in Lewisburg
John Wesley Methodist Church in Lewisburg
The Greenbrier in White Sulphur Springs
John A. North House (Frazier's Star Tavern) in Lewisburg
Tuckwiller Tavern (Valley View Stock Farm) near Lewisburg
Elmhurst in Caldwell
Hartland (Rogers Farm) near Lewisburg
"Governor" Samuel Price House in Lewisburg
David S. Creigh House (Montescena) near Lewisburg
The Alexander A. Arbuckle House near Lewisburg
The Mount Tabor Baptist Church in Lewisburg
Morlunda (Colonel Samuel McClung Place) near Lewisburg
Lewisburg Historic District in Lewisburg
Alexander McVeigh Miller House (The Cedars) in Alderson
"Tusawilla" (Knight Farm) in Lewisburg
Colonel James Graham House near Lowell
James Withrow House (John Montgomery House) in Lewisburg
Mountain Home near White Sulphur Springs

Appendix D

ANNUAL PEAK STAGES AND DISCHARGES

Greenbrier River at Durbin

Drainage Area: 134 square miles

Gage: Recording. Datum of gage is 2,699.71 feet above mean sea level, datum of 1929.

State-discharge Relation: Defined by current-meter measurements below 4,300 cfs and extended above by logarithmic plotting.

Remarks: Base for partial-duration series, 2,800 cfs.

<u>Water Year</u>	<u>Date</u>	<u>Gage Height (Ft.)</u>	<u>Discharge (cfs)</u>
1944	February 23, 1944	6.49	5,110
1945	December 26, 1944	5.41	3,340
1946	January 7, 1946	6.42	4,940
1947	March 25, 1947	5.18	3,040
1948	April 14, 1948	5.96	4,200
1949	June 18, 1949	5.05	2,780
1950	January 31, 1950	5.20	3,010
1951	December 7, 1950	6.07	4,600
1952	January 27, 1952	5.18	3,010
1953	February 21, 1953	6.21	4,600
1954	March 1, 1954	5.60	3,640
1955	October 15, 1954	8.38	9,900
1956	August 6, 1956	4.97	2,640
1957	January 23, 1957	5.72	3,800
1958	April 6, 1958	5.92	4,120
1959	January 22, 1959	6.67	4,970
1960	April 4, 1960	7.12	6,920
1961	February 25, 1961	6.74	6,040
1962	March 21, 1962	5.92	4,370
1963	March 19, 1963	7.34	7,450
1964	March 5, 1964	7.48	7,760
1965	January 2, 1965	5.20	2,550
1966	February 13, 1966	5.64	3,800

Appendix D

ANNUAL PEAK STAGES AND DISCHARGES

Greenbrier River at Buckeye

Drainage Area: 540 square miles, including that of Swago Creek.

Gage: Non-recording prior to February 28, 1939; recording thereafter.
Datum of gage is 2,058.89 feet above mean sea level, datum of 1929.

Stage-discharge Relation: Defined by current-meter measurements below
25,000 cfs.

Remarks: Base for partial-duration series, 8,000 cfs.

<u>Water Year</u>	<u>Date</u>	<u>Gage Height (Ft.)</u>	<u>Discharge (cfs)</u>
1930	November 18, 1929	11.70	17,200
1931	April 4, 1931	9.00	9,540
1932	February 5, 1932	17.50	41,500
1933	March 19, 1933	8.8	8,920
1934	March 5, 1934	10.43	13,300
1935	January 23, 1935	11.8	17,600
1936	March 17, 1936	15.7	32,800
1937	January 20, 1937	12.0	18,300
1938	May 24, 1938	10.9	14,800
1939	February 4, 1939	14.3	26,800
1940	April 20, 1940	10.03	12,200
1941	April 5, 1941	7.24	5,630
1942	May 16, 1942	13.70	24,400
1943	December 30, 1942	11.86	18,000
1944	February 23, 1944	11.41	16,300
1945	December 26, 1944	9.70	11,400
1946	January 7, 1946	12.45	19,700
1947	March 14, 1947	10.02	12,200
1948	April 14, 1948	14.19	26,400
1949	December 15, 1948	10.80	14,500
1950	January 31, 1950	11.20	14,700
1951	December 8, 1950	12.54	19,000
1952	March 11, 1952	12.01	17,500
1953	February 21, 1953	14.57	27,200
1954	July 15, 1954	13.06	20,700
1955	October 16, 1954	15.07	27,300
1956	March 14, 1956	9.36	9,900
1957	January 23, 1957	11.30	15,100
1958	May 5, 1958	11.37	15,400
1959	June 2, 1959	11.20	14,800
1960	April 4, 1960	12.85	19,800
1961	February 25, 1961	12.32	18,200

Appendix D

ANNUAL PEAK STAGES AND DISCHARGES

Greenbrier River at Alderson

Drainage Area: 1,357 square miles.

Gage: Non-recording prior to October 15, 1929; recording thereafter.
At site 400 feet downstream at same datum prior to October 15, 1929.
Datum of gage is 1,529.42 feet above mean sea level, datum of 1929.

Stage-discharge Relation: Defined by current-meter measurements below
30,000 cfs.

Remarks: Base for partial-duration series, 17,000 cfs.

<u>Water Year</u>	<u>Date</u>	<u>Gage Height (Ft.)</u>	<u>Discharge (cfs)</u>
1896	March 30, 1896	11.3	28,800
1897	February 23, 1897	17.5	54,000
1898	August 11, 1898	17.05	52,500
1899	March 5, 1899	16.15	48,900
1900	March 21, 1900	8.23	17,100
1901	November 26, 1900	18.23	56,800
1902	December 15, 1901	13.32	36,700
1903	March 23, 1903	16.17	48,900
1904	January 23, 1904	10.50	25,700
1904	May 19, 1904	10.50	25,700
1905	May 12, 1905	13.35	37,600
1906	January 23, 1906	10.6	26,000
1907	June 14, 1907	17.0	52,500
1908	February 16, 1908	17.0	52,500
1908	May 8, 1908	12.0	31,500
1909	April 15, 1909	9.0	20,000
1910	June 17, 1910	15.5	45,900
1911	January 30, 1911	15.0	43,800
1912	March 16, 1912	13.0	35,500
1913	March 27, 1913	19.4	64,000
1914	February 20, 1914	8.0	16,400
1915	February 2, 1915	14.5	40,800
1916	October 2, 1915	11.3	27,200
1917	March 4, 1917	15.0	43,000
1918	March 14, 1918	22.00	77,500
1919	January 2, 1919	16.3	49,000
1920	December 7, 1919	14.0	38,000
1921	December 15, 1920	6.95	11,500
1922	February 21, 1922	10.50	22,200
1923	February 2, 1923	9.58	19,500
1924	May 12, 1924	13.60	36,200
1925	March 20, 1925	8.2	15,100

Appendix D

ANNUAL PEAK STAGES AND DISCHARGES

Greenbrier River at Alderson (Continued)

<u>Water Year</u>	<u>Date</u>	<u>Gage Height (Ft.)</u>	<u>Discharge (cfs)</u>
1926	January 20, 1926	9.95	20,700
1927	December 26, 1926	14.50	40,200
1928	May 1, 1928	9.00	18,000
1929	February 28, 1929	13.15	32,700
1930	November 18, 1929	14.20	36,600
1931	April 5, 1931	8.40	14,500
1932	February 5, 1932	16.96	50,100
1933	March 20, 1933	11.68	26,400
1934	March 5, 1934	13.23	32,300
1935	January 23, 1935	16.87	49,600
1936	March 18, 1936	18.62	58,600
1937	January 21, 1937	14.16	36,600
1938	October 28, 1937	13.32	32,800
1939	February 4, 1939	15.34	41,600
1940	April 20, 1940	12.57	29,900
1941	April 6, 1941	7.57	11,500
1942	May 17, 1942	13.88	35,300
1943	March 13, 1943	14.08	36,200
1944	February 23, 1944	11.35	25,200
1945	January 2, 1945	9.70	19,000
1946	January 8, 1946	15.68	43,600
1947	March 14, 1947	11.15	24,400
1948	April 15, 1948	15.69	40,300
1949	December 16, 1948	14.94	37,100
1950	January 31, 1950	13.35	31,500
1951	June 14, 1951	12.75	29,300
1952	March 12, 1952	12.58	27,600
1953	February 22, 1953	17.43	47,100
1954	March 1, 1954	13.20	29,700
1955	March 6, 1955	16.76	44,400
1956	March 15, 1956	9.50	18,200
1957	January 30, 1957	12.58	28,900
1958	May 6, 1958	12.01	26,700
1959	June 3, 1959	11.19	23,900
1960	March 31, 1960	14.42	35,500
1961	February 26, 1961	13.28	31,400
1962	March 22, 1962	14.43	35,500
1963	March 12, 1963	17.95	47,200
1964	March 6, 1964	15.64	39,600
1965	February 8, 1965	12.47	28,400
1966	February 14, 1966	11.89	26,400

ANNUAL PEAK STAGES AND DISCHARGES

Greenbrier River at Hilldale

Drainage Area: 1,625 square miles, including that of Howard Creek.

Gage: Recording. Datum of gage is 1,388.66 feet above mean sea level, datum of 1929 (levels by Corps of Engineers).

State-discharge Relation: Defined by current-meter requirements below 58,000 cfs.

Remarks: Base for partial-duration series, 18,000 cfs.

<u>Water Year</u>	<u>Date</u>	<u>Gage Height (Ft.)</u>	<u>Discharge (cfs)</u>
1936	March 18, 1936	21.85 ^a	60,800
1937	January 21, 1937	17.27	37,200
1938	October 28, 1937	16.03	32,300
1939	February 4, 1939	17.99	40,000
1940	April 20, 1940	15.92	32,000
1941	April 6, 1941	9.58	13,800
1942	May 17, 1942	16.33	33,400
1943	March 14, 1943	17.16	38,900
1944	February 23, 1944	13.73	25,600
1945	March 6, 1945	11.93	20,300
1946	January 8, 1946	19.00	47,100
1947	March 15, 1947	13.73	25,700
1948	April 15, 1948	18.65	45,300
1949	December 16, 1948	18.10	43,000
1950	February 1, 1950	16.52	36,100
1951	June 14, 1951	15.2	30,900
1952	March 12, 1952	15.00	29,800
1953	February 22, 1953	20.50	47,800
1954	March 2, 1954	15.88	32,700
1955	March 6, 1955	20.50	47,800
1956	March 15, 1956	11.63	19,500
1957	January 30, 1957	15.68	32,000
1958	May 6, 1958	14.60	28,600
1959	June 3, 1959	13.16	24,200
1960	March 31, 1960	17.32	37,200
1961	February 26, 1961	16.00	33,300
1962	March 22, 1962	17.13	36,900
1963	March 12, 1963	21.18	51,000
1964	March 6, 1964	18.27	40,090
1965	February 8, 1965	15.28	31,000
1966	February 14, 1966		30,000

a. From information by Corps of Engineers, maximum known.

Source: Geological Survey Water-Supply Paper 1675, Magnitude and Frequency of Floods in the United States, Speer, P. R., and C. R. Gamble, United States Department of Interior, Geological Survey, Washington, D.C., 1965.

Appendix E

WATER QUANTITY SUMMARY ^{3/}

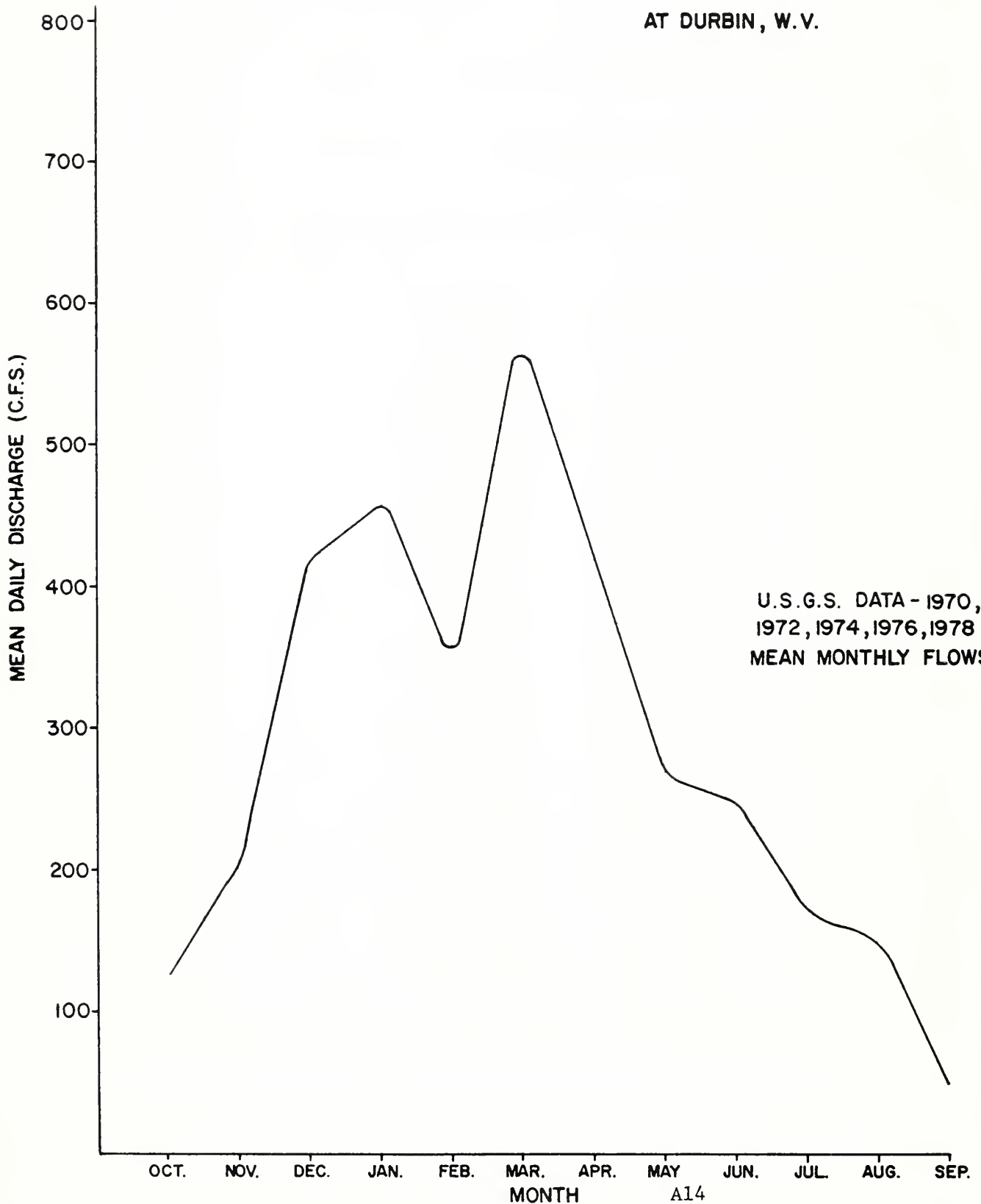
<u>Station</u>	<u>Number</u>	<u>Drainage Area (mi.²)</u>	<u>Period of Record</u>	<u>Daily Flows (cfs)</u>		
				<u>Mean</u>	<u>Max.</u>	<u>Min.</u>
Durbin	03180500	134	3/43 - 1980	256	12,500 (03/07/67)	0 (10/02/68)
Buckeye	03182500	540	9/29 - 1980	873	41,500 (02/05/32)	3.8 (08/13/30)
Alderson	03183500	1357	7/95 - 1980	1994	77,500 (03/14/18)	24 (08/12/30)
Hilldale	03184000	1625	6/36 - 1980	2244	58,100 (12/17/73)	39 (09/18/36)

^{3/} Data collection by United States Department of Interior, Geological Survey.

APPENDIX F

HYDROGRAPH FOR
GREENBRIER RIVER

AT DURBIN, W.V.



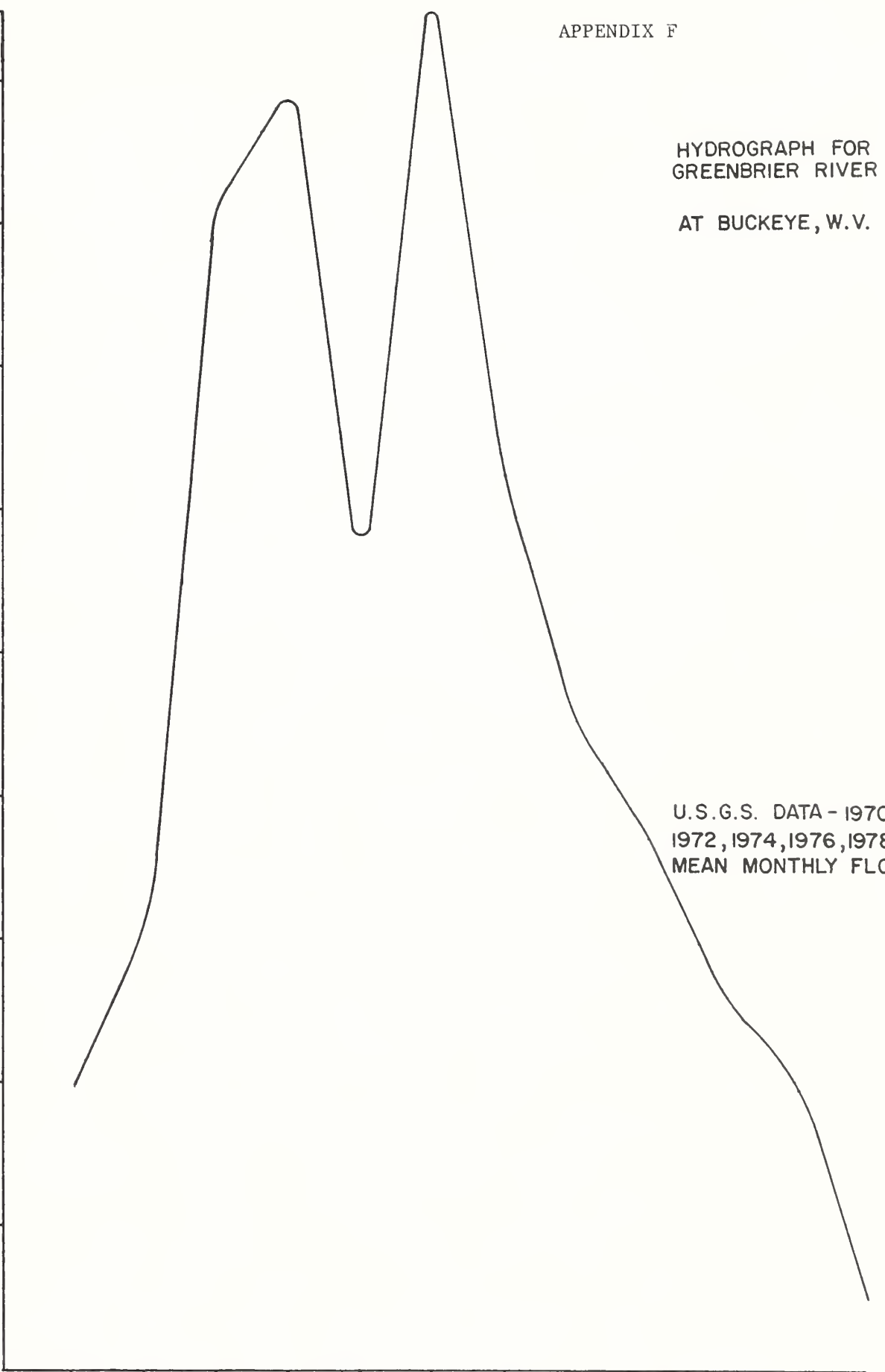
HYDROGRAPH FOR
GREENBRIER RIVER
AT BUCKEYE, W.V.

MEAN DAILY DISCHARGE (C.F.S.)

U.S.G.S. DATA - 1970,
1972, 1974, 1976, 1978
MEAN MONTHLY FLOWS

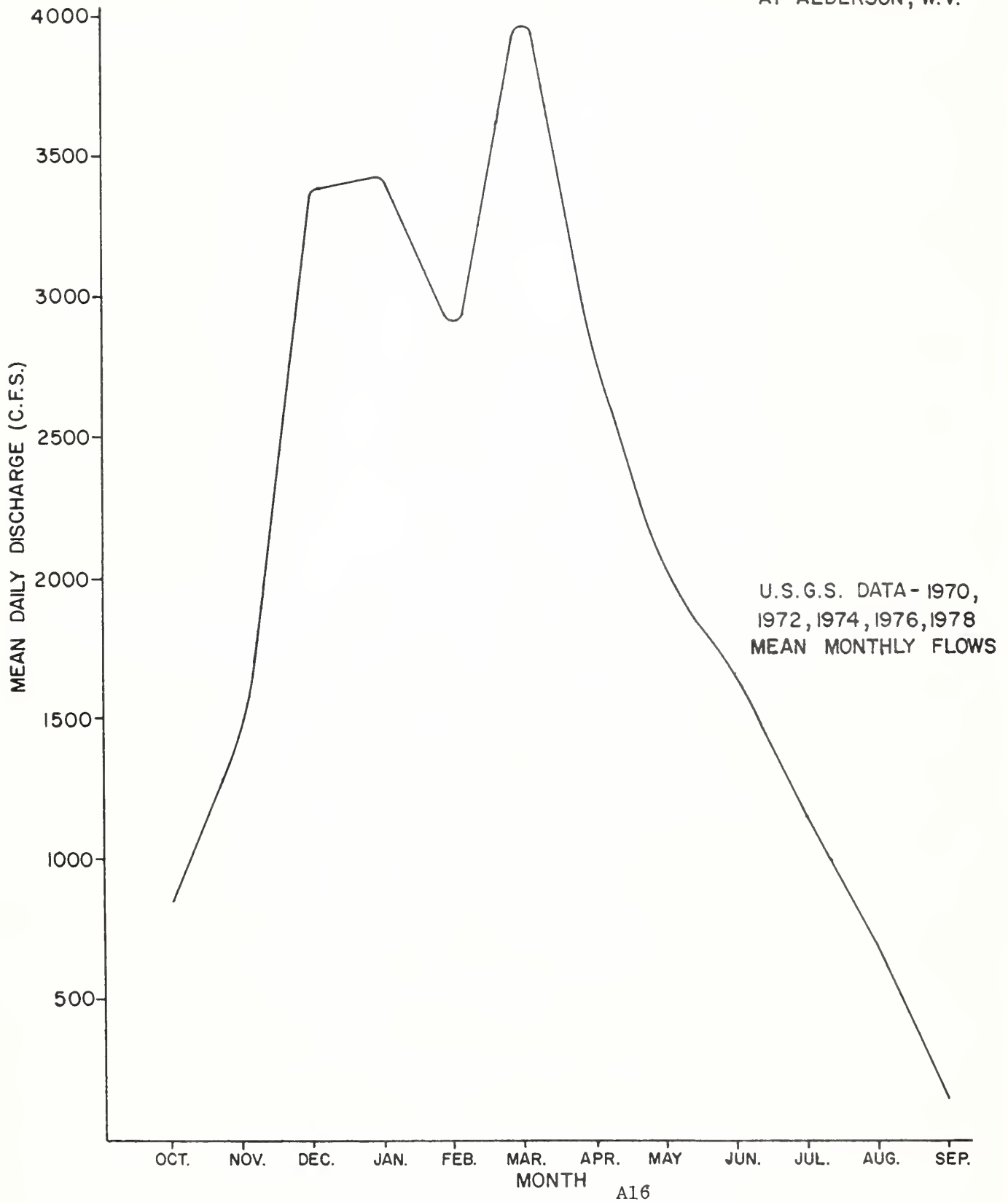
1900
1800
1600
1400
1200
1000
800
600
400
200

OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP.
MONTH A15



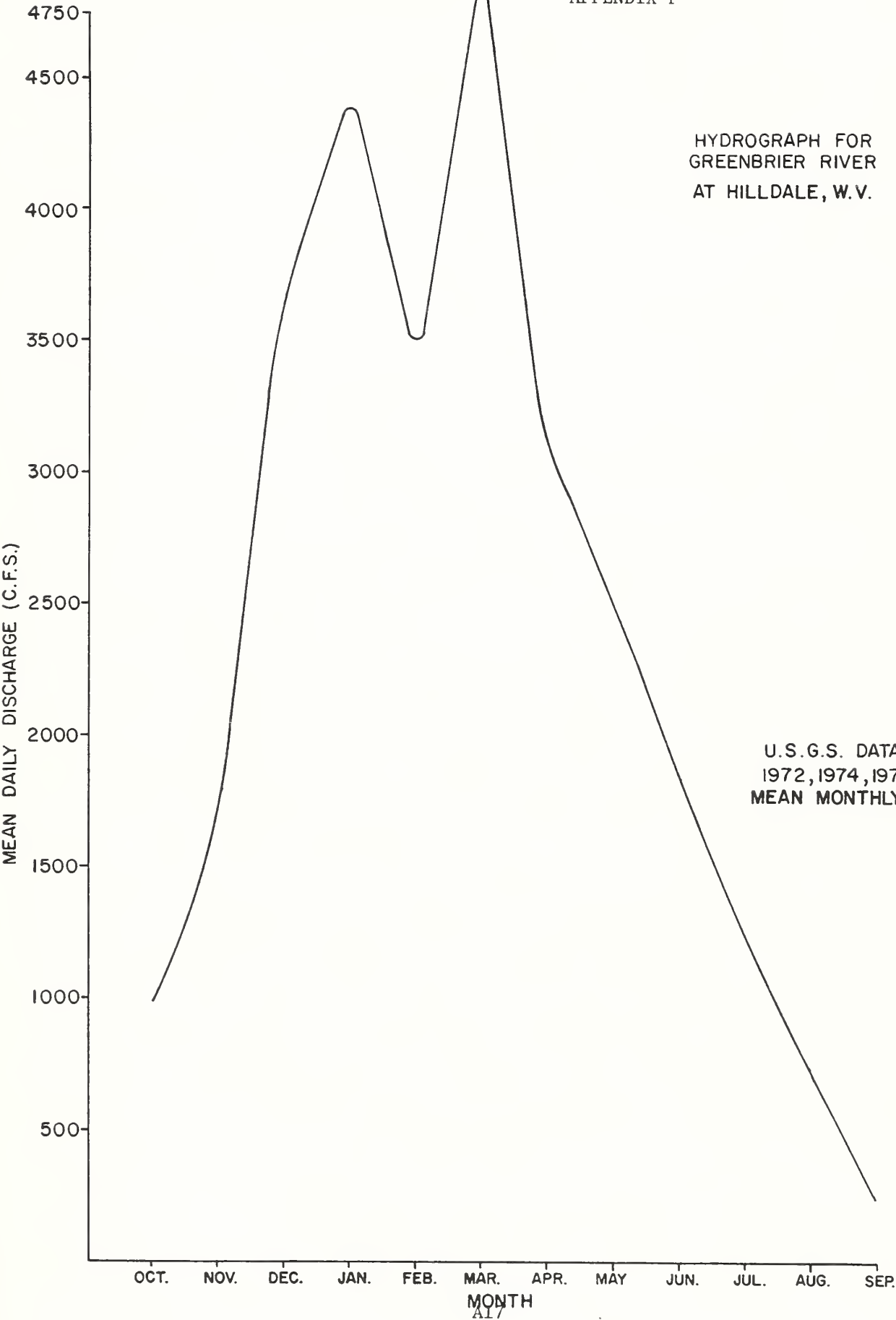
APPENDIX F

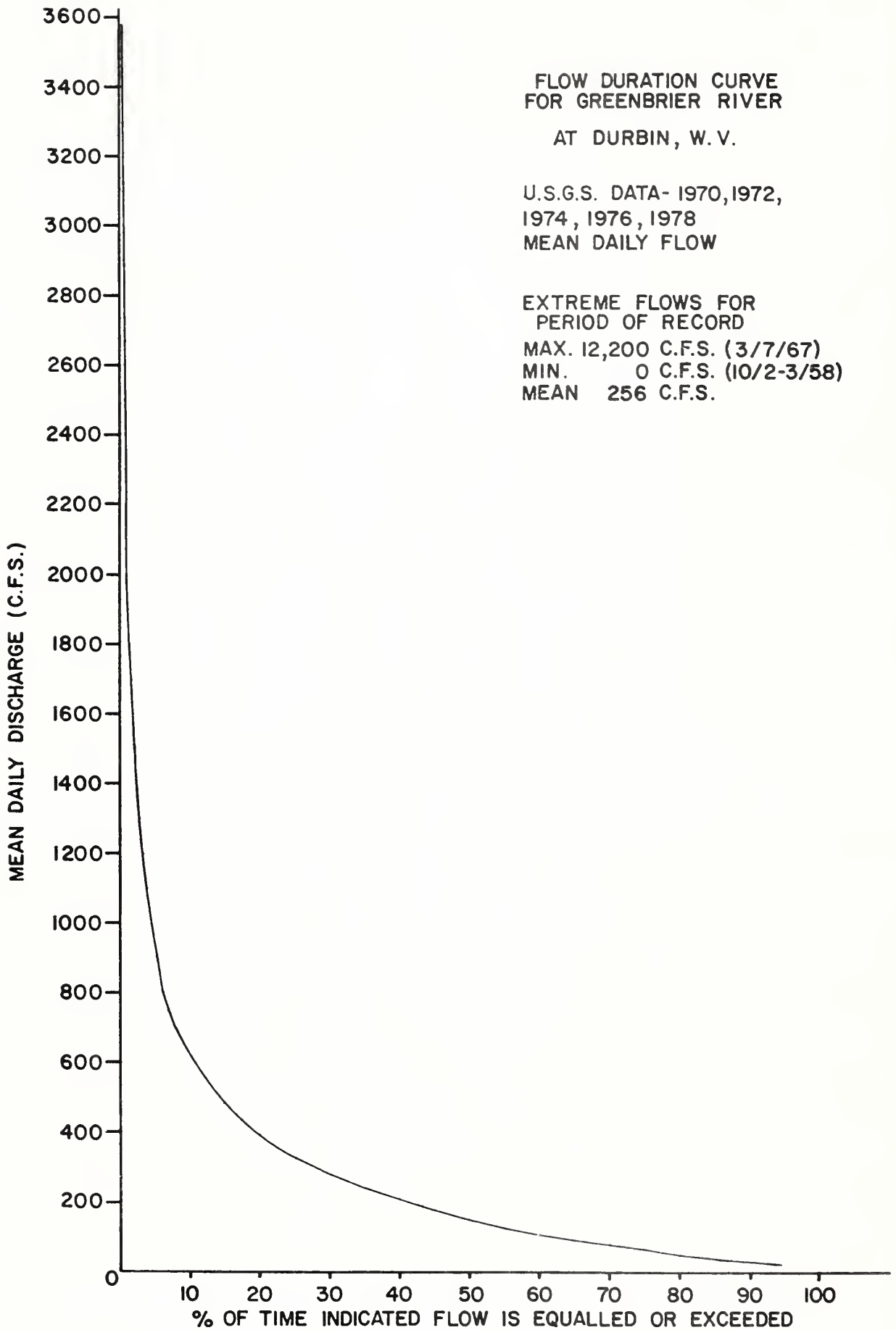
HYDROGRAPH FOR
GREENBRIER RIVER
AT ALDERSON, W.V.



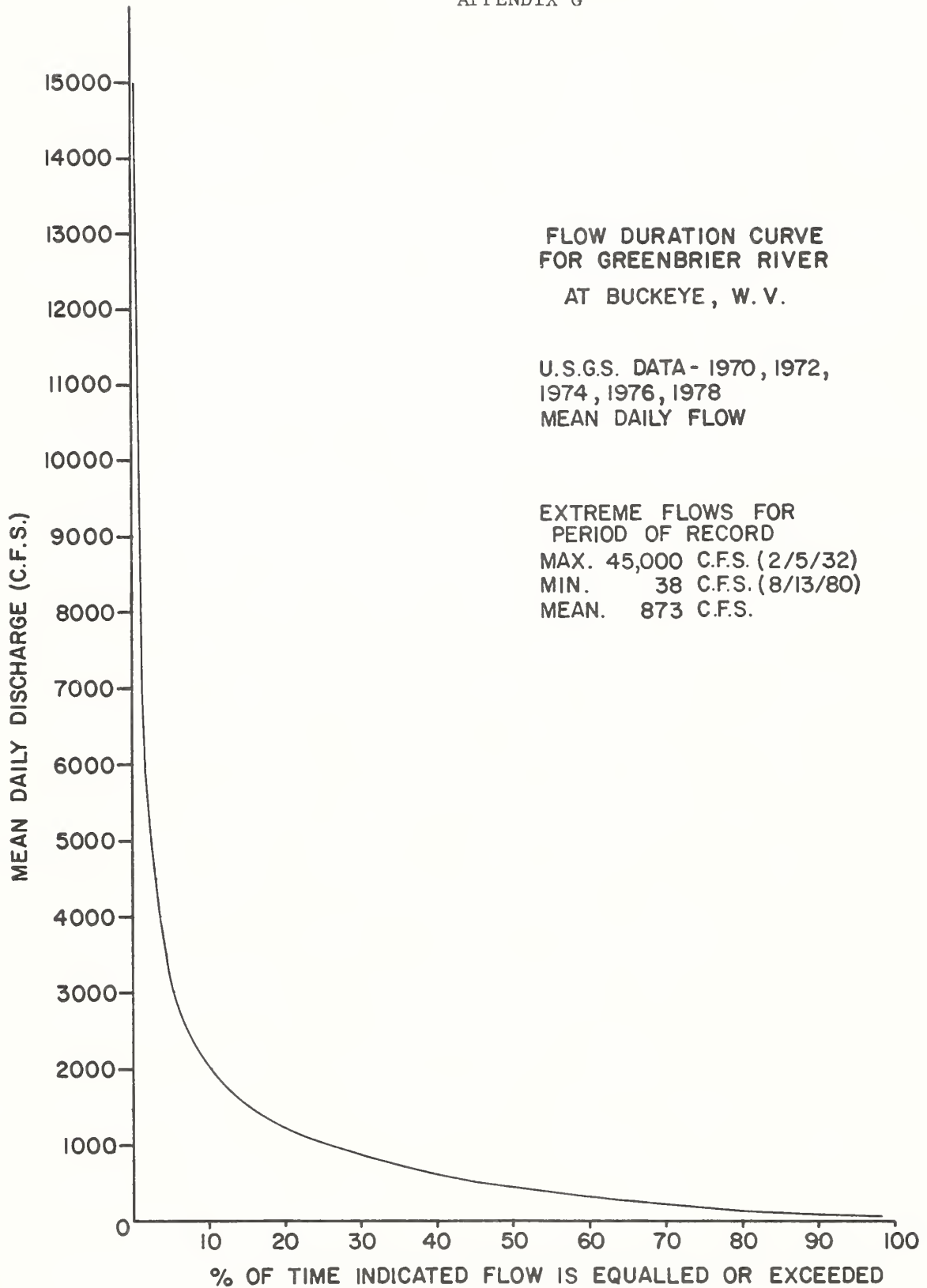
HYDROGRAPH FOR
GREENBRIER RIVER
AT HILLDALE, W.V.

U.S.G.S. DATA - 1970,
1972, 1974, 1976, 1978
MEAN MONTHLY FLOWS

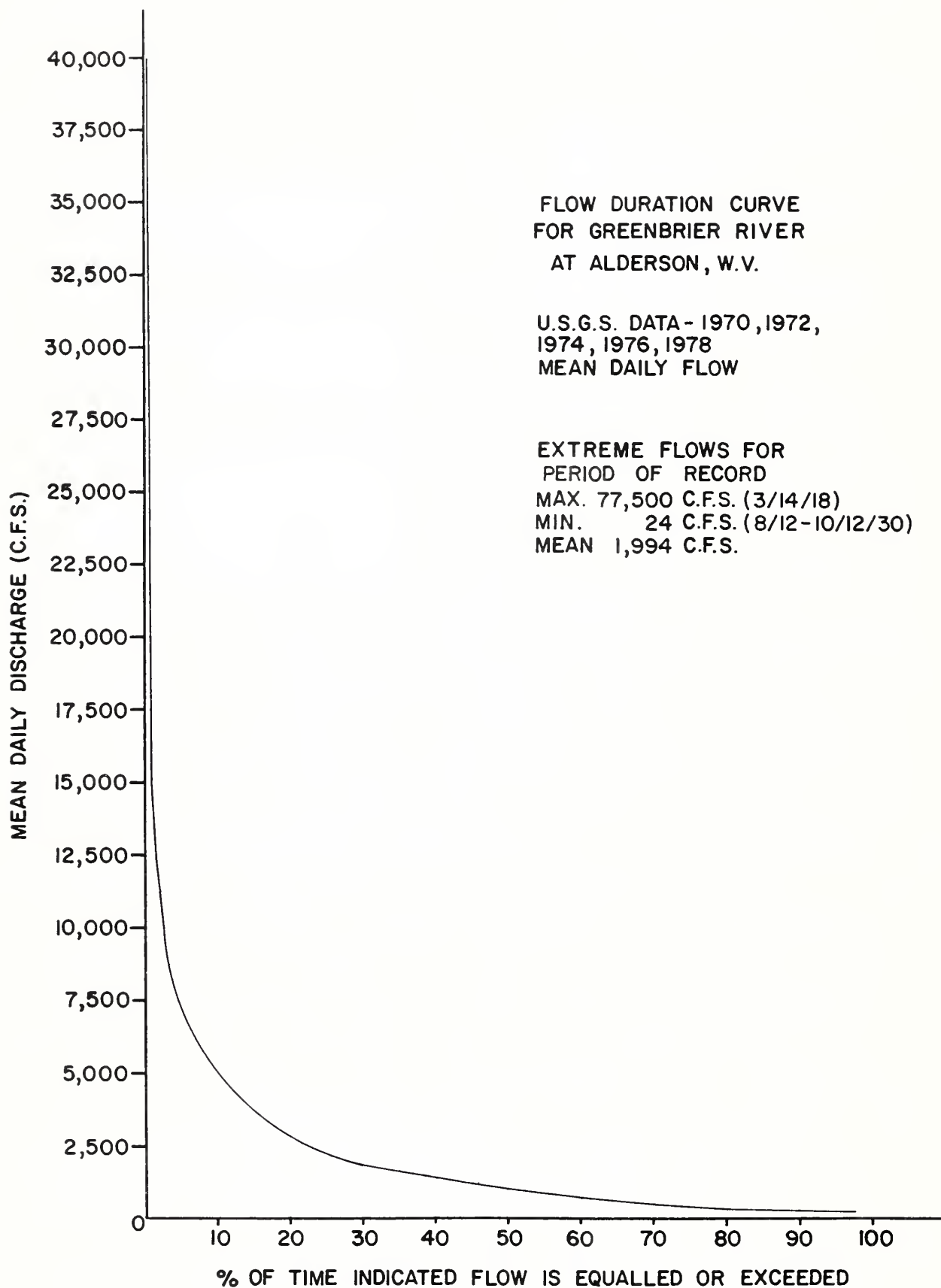




APPENDIX G



APPENDIX G



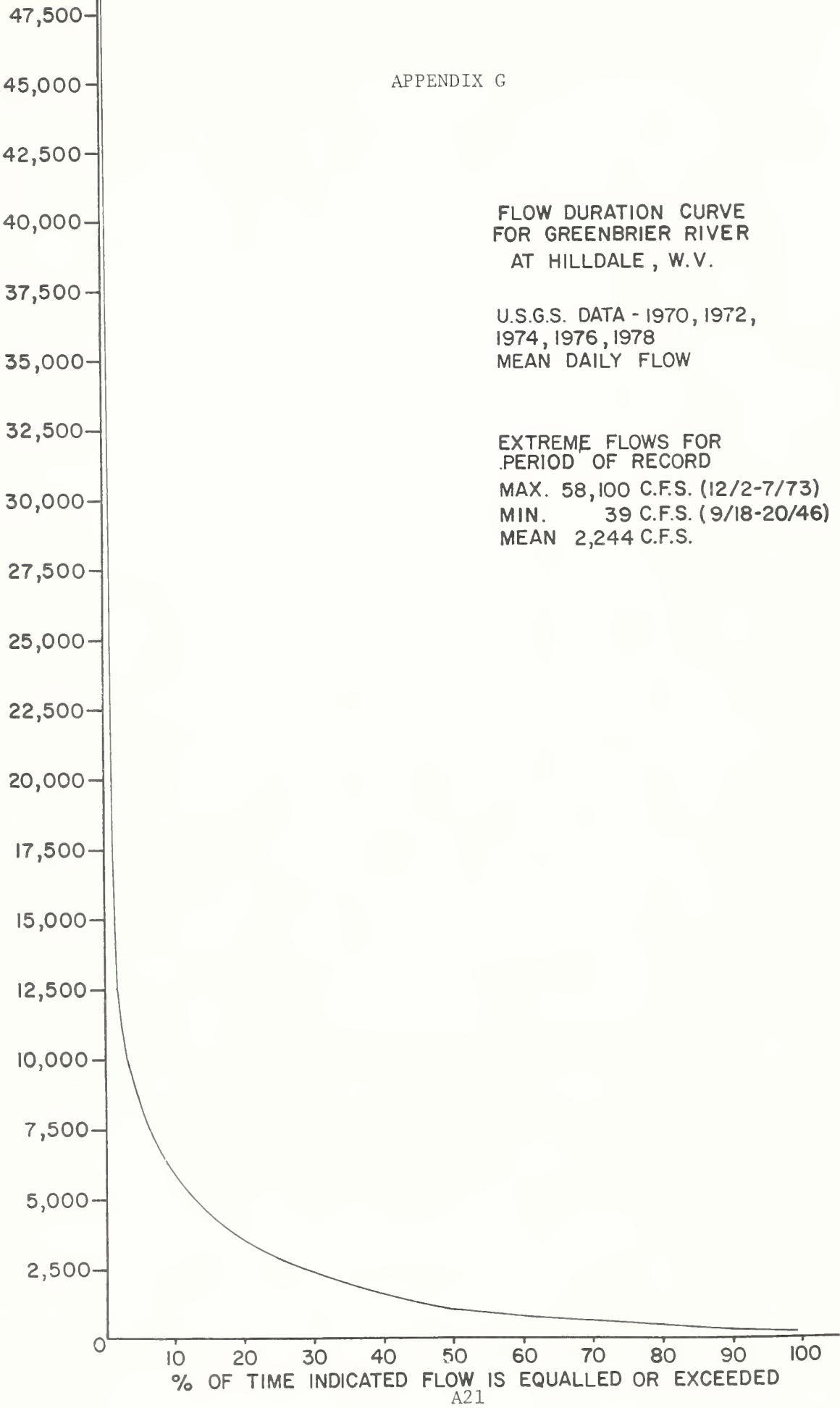
APPENDIX G

FLOW DURATION CURVE
FOR GREENBRIER RIVER
AT HILLDALE, W.V.

U.S.G.S. DATA - 1970, 1972,
1974, 1976, 1978
MEAN DAILY FLOW

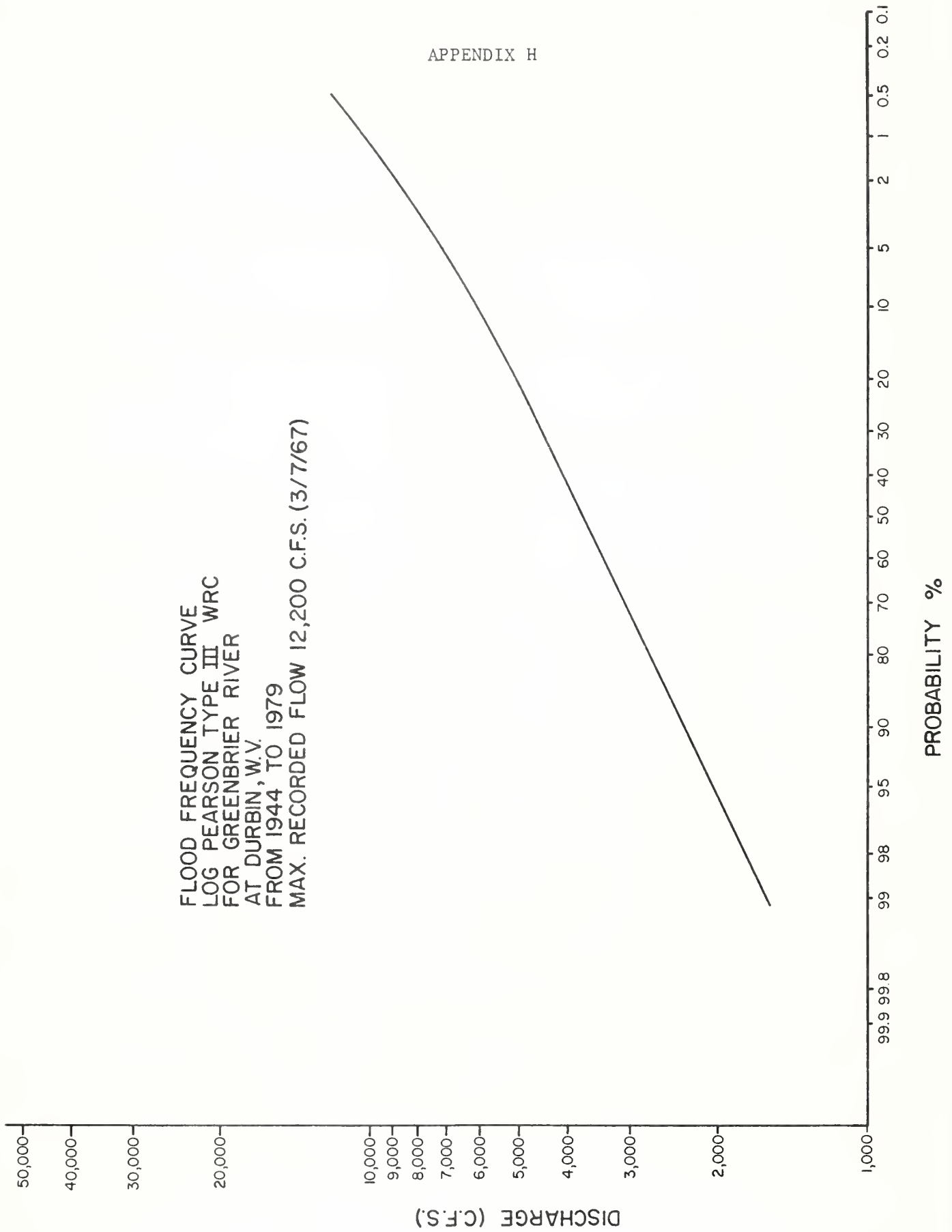
EXTREME FLOWS FOR
PERIOD OF RECORD
MAX. 58,100 C.F.S. (12/2-7/73)
MIN. 39 C.F.S. (9/18-20/46)
MEAN 2,244 C.F.S.

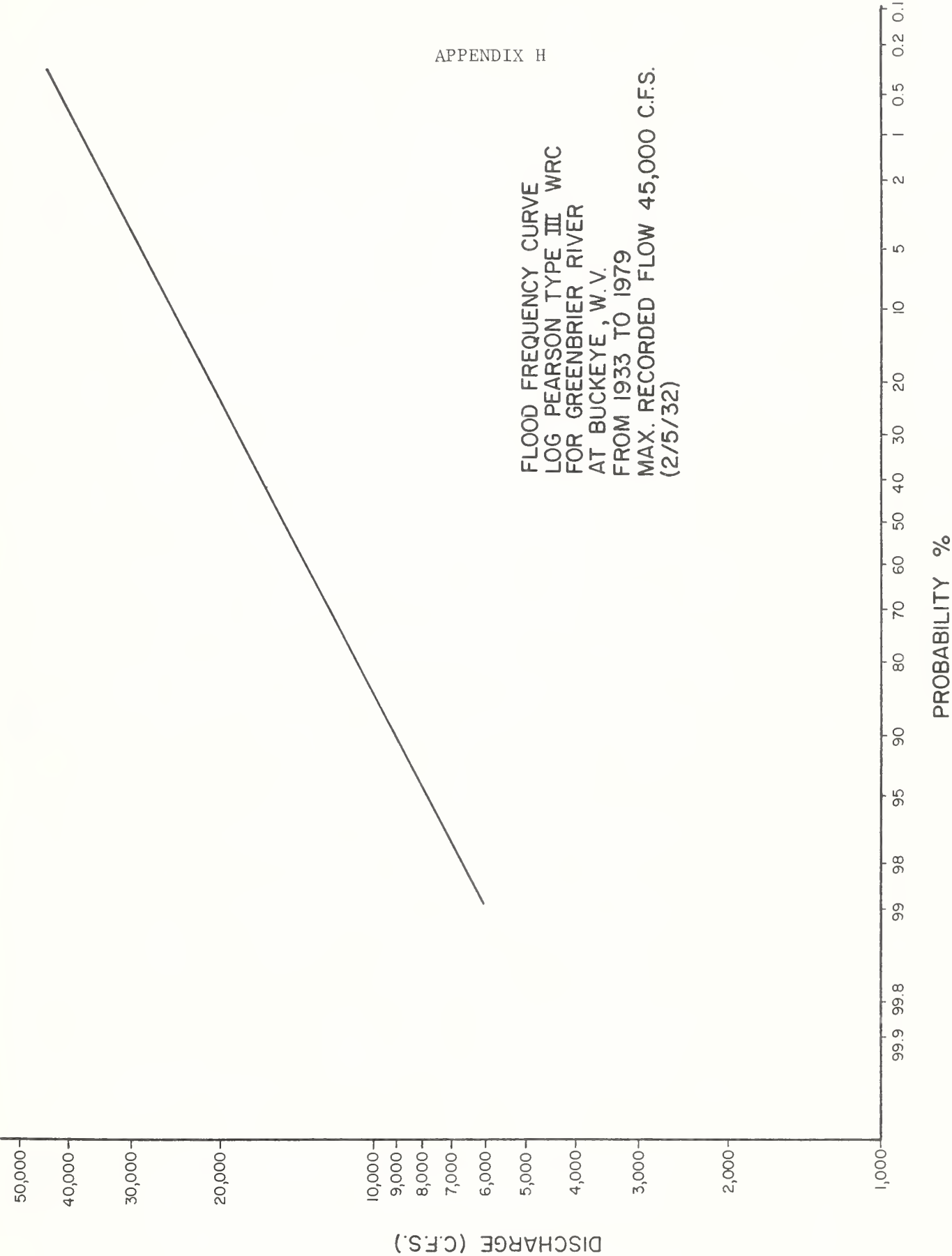
MEAN DAILY DISCHARGE (C.F.S.)



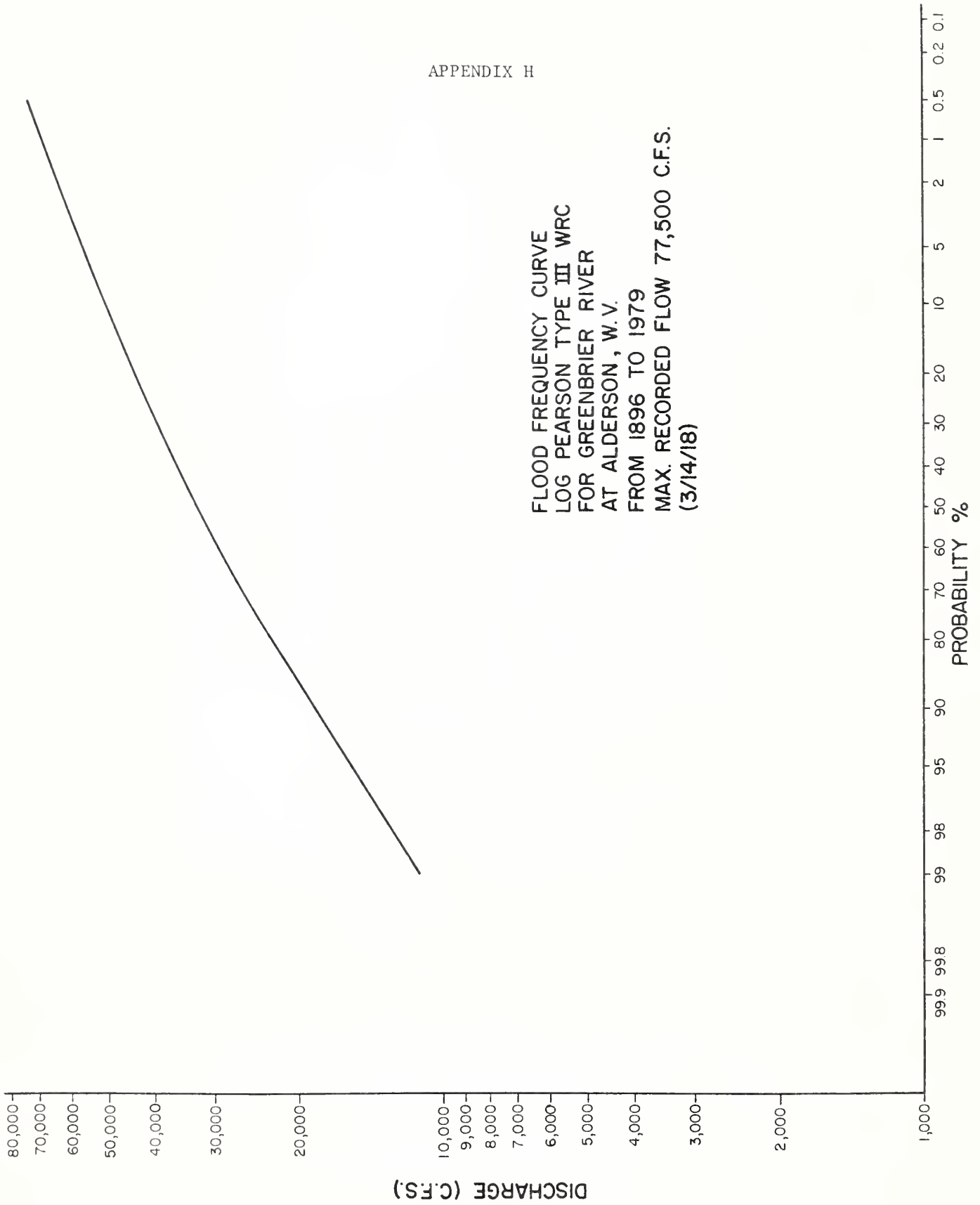
APPENDIX H

FLOOD FREQUENCY CURVE
 LOG PEARSON TYPE III WRC
 FOR GREENBRIER RIVER
 AT DURBIN, W.V.
 FROM 1944 TO 1979
 MAX. RECORDED FLOW 12,200 C.F.S. (3/7/67)



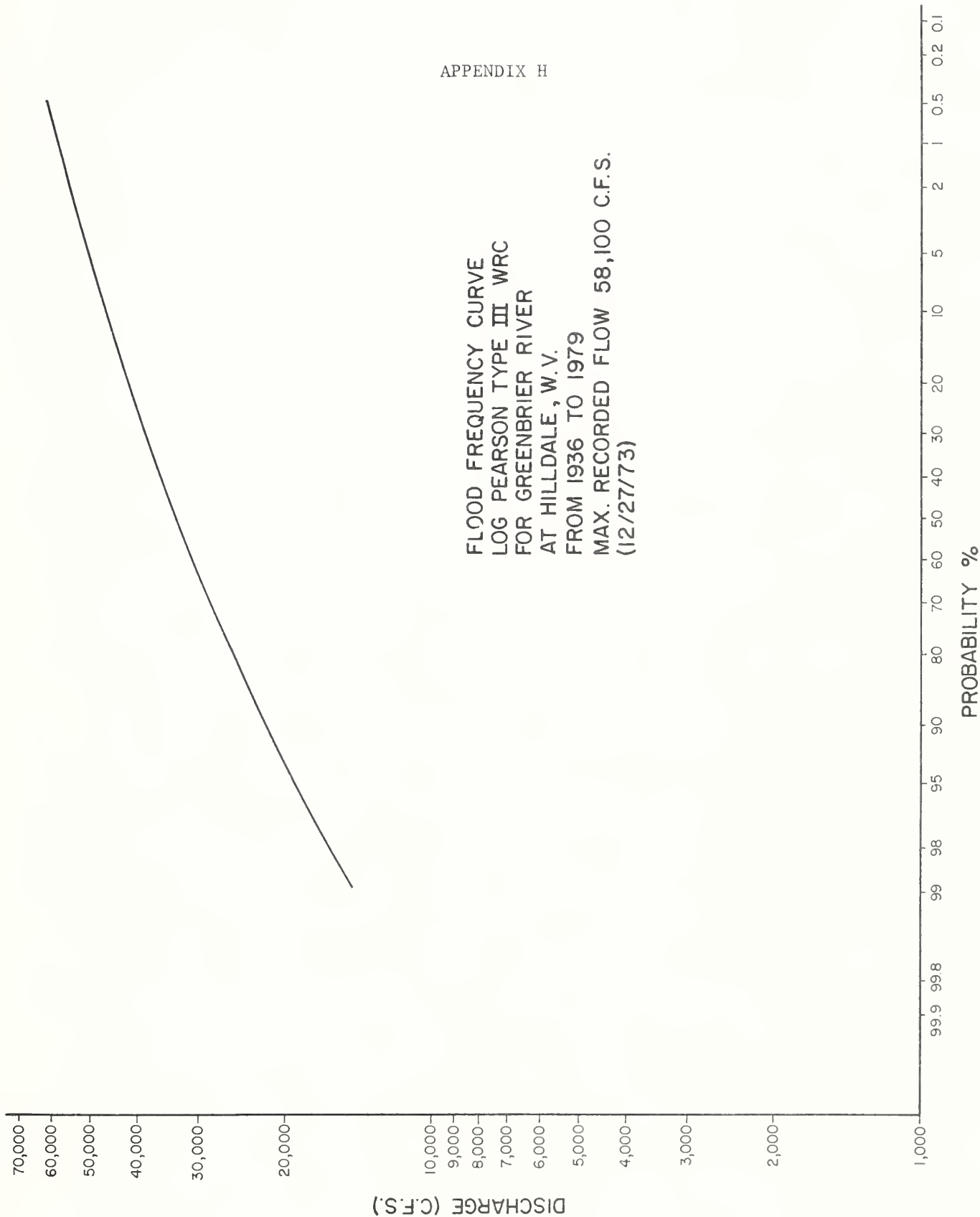


APPENDIX H



APPENDIX H

FLOOD FREQUENCY CURVE
LOG PEARSON TYPE III WRC
FOR GREENBRIER RIVER
AT HILLDALE, W.V.
FROM 1936 TO 1979
MAX. RECORDED FLOW 58,100 C.F.S.
(12/27/73)



Appendix I

WATER QUALITY SAMPLING DATA FOR GREENBRIER RIVER

<u>Station Location</u>	<u>Operator</u>	<u>No. of Samples</u>	<u>Period of Record</u>
Bartow (East Fork)	USFS	20	1971 - 1980
Durbin (West Fork)	USFS	20	1970 - 1980
Durbin	USFS	20	1970 - 1980
Marlinton	USFS	20	1970 - 1980
Buckeye	WVDNR	20	1974 - 1978
Anthony	USFS	15	1970 - 1975
		5	1979 - 1980
Hilldale	WVDNR	50	1974 - 1979
Alderson	WVDNR	4	1979

Appendix J

"AESTHETICS - GENERAL CRITERIA" GREENBRIER RIVER

<u>Key Criteria</u>	<u>Durbin</u>	<u>Marlinton</u>	<u>Sampling Stations</u>		<u>Hilldale</u>	<u>Alderson</u>
			<u>Buckeye</u>	<u>Anthony</u>		
A. Fresh Water Organisms						
1) Dissolved Materials	YS	YS	YS	YS	YS	Y
2) pH	Y	Y	Y	Y	Y	Y
3) Temperature	Y	Y	Y	Y	Y	Y
4) Dissolved Oxygen	Y	Y	Y	Y	Y	Y
5) Carbon Dioxide	ND	ND	ND	ND	ND	ND
6) Oil	YS	YS	YS	YS	YS	ND
7) Turbidity	Y	Y	Y	Y	Y	ND
8) Settleable Materials	YS	YS	Y	YS	Y	ND
9) Color	YS	YS	Y	YS	Y	ND
10) Floating Materials	YS	YS	Y	YS	Y	ND
11) Tainting Substance	YS	YS	Y	YS	Y	ND
12) Radionuclides	YS	YS	YS	YS	YS	ND
13) Plant Nutrients & Nuisance Growths	YS	YS	YS	YS	YS	ND
14) Toxic Substances	YS	YS	Y	YS	Y	ND
15) Bioassay	YS	YS	YS	YS	YS	ND
16) Heavy Metals						
a. Zinc	Y	Y	Y	Y	Y	ND
b. Copper	Y	Y	Y	Y	Y	ND
c. Cadmium	ND	ND	Y	ND	Y	ND
d. Hexavalent Chromium	ND	ND	Y	ND	Y	ND
e. Cyanide	ND	ND	Y	ND	N	ND
f. Ammonia	Y	Y	Y	Y	Y	ND
17) Detergents & Surfactants	YS	YS	YS	YS	Y	ND
B. Aesthetics						
General Criteria	Y	Y	Y	Y	Y	Y

Codes: Y = Yes, meets criteria

YS = Yes Subjectively, meets criteria through interpretation, comparative and logical deduction.

N = No, fails to meet criteria.

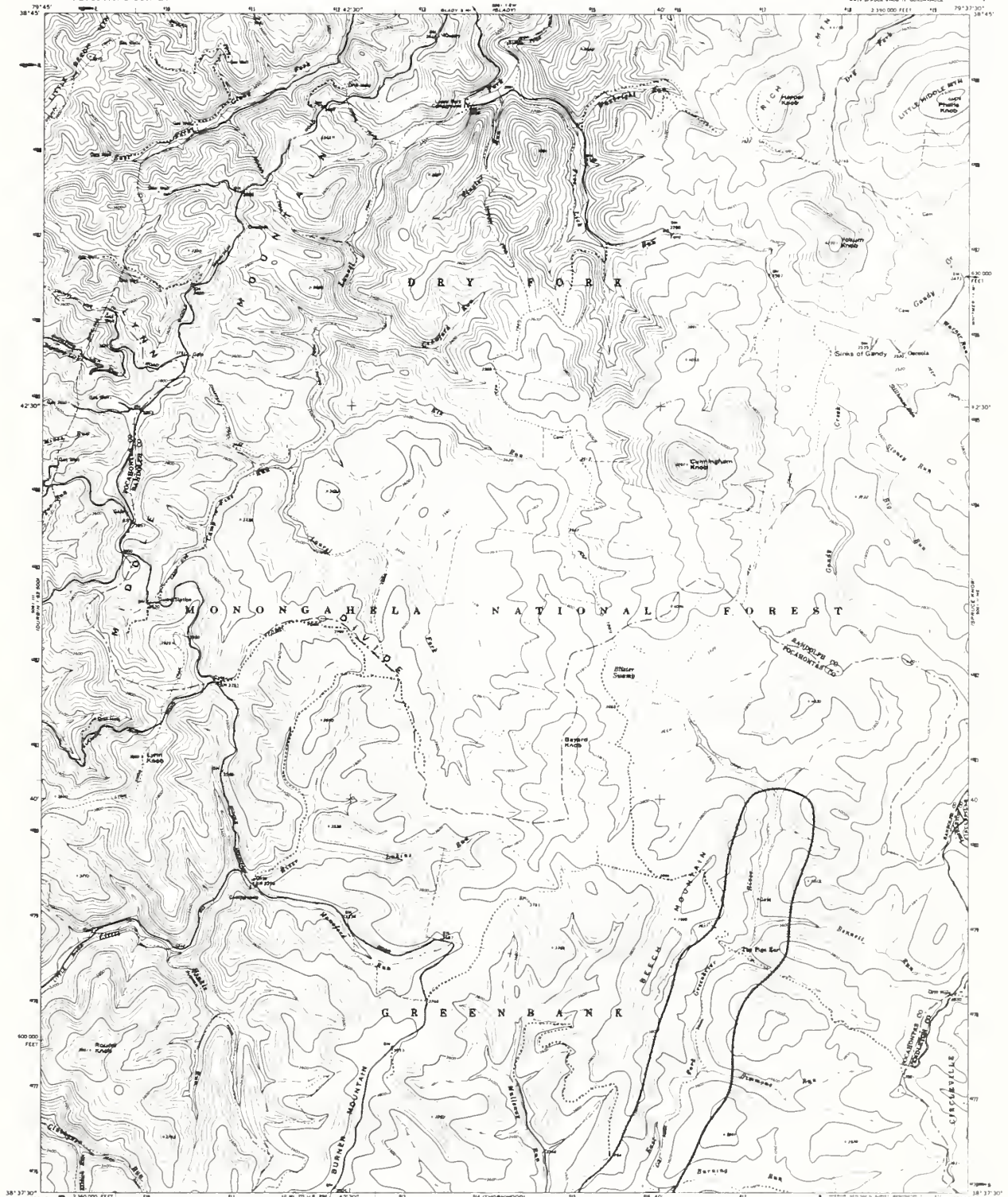
ND = Data not available.

Appendix K

MAP OF
STUDY CORRIDOR
U.S. GEOLOGICAL SERIES

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SINKS OF GANDY QUADRANGLE
WEST VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

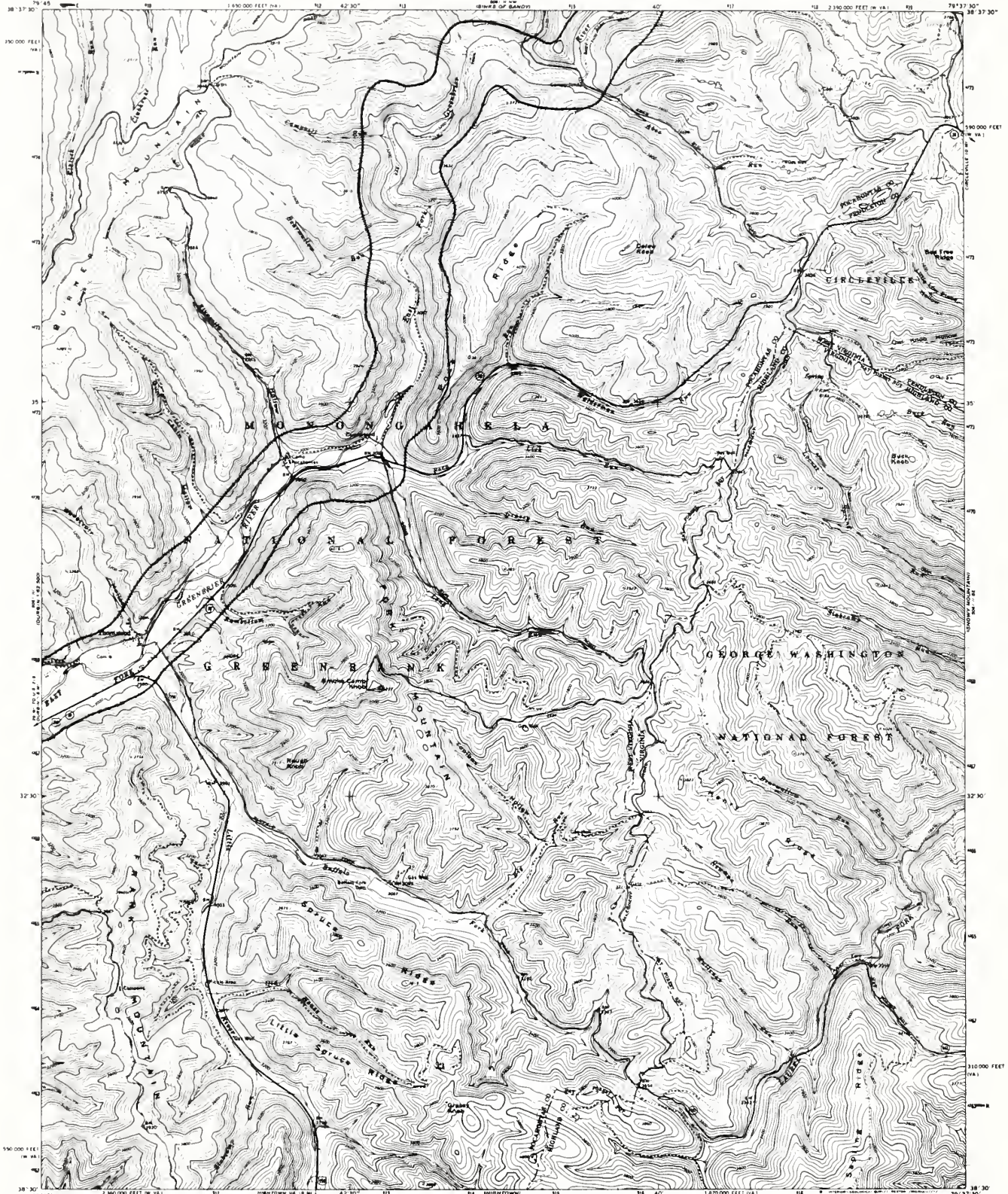


Maped, edited, and published by the Geological Survey
Control by USGS and USCGS
Topography by photogrammetric methods from aerial
photography taken 1969. First checked 1970
Polyconic projection. 1927 North American datum
10,000-foot grid based on West Virginia coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks,
zone 17, shown in blue
Fine red dashed lines indicate selected fence and road lines where
generally visible from aerial photographs. This information is unclassified



CON. 1:62,500 (1:62,500)
Datum: 1927 North American Datum
This map complies with National Map Accuracy Standards
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Primary highway: light duty road, hard or
hard surface
Secondary highway: improved surface
card surface
Unimproved road
Interstate Route U.S. Route State Route
SINKS OF GANDY, W. VA.
7.5 MINUTE SERIES (TOPOGRAPHIC)
1970
AMS 506 7.5 MINUTE SERIES 1974



Map compiled and published by the Geological Survey in cooperation with Commonwealth of Virginia agencies. Control by USGS and USACGS.

Topography by photogrammetric methods from aerial photographs taken 1967. Contour checked 1969.

Projection: 1927 North American datum. 10,000 foot grid based on West Virginia coordinate system. South zone, and Virginia coordinate system, north zone. 1000 metre Universal Transverse Mercator grid. Grid lines 17, shown in blue.

If not, red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is uncharted.



ROAD CLASSIFICATION

Primary highway all weather: Light-duty road all weather:
hard surface: improved surface
Unimproved road, tan or dry
weather: weather

□ U.S. Route ○ State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY RESTON VIRGINIA 22062
AND VIRGINIA DIVISION OF MINERAL RESOURCES CHARLOTTEVILLE VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



A30

THORNWOOD, W. VA. - VA.
SW 1/4 BRIDGE AND 1/4 QUADRANGLE
N 38 30' - W 73 37' 5"

1969

AMS 501:1 SW-SERIES 1954

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

WILDELL QUADRANGLE
WEST VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
6-14 DUBOIS 1:62,500



Maped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs
taken 1973. Field checked 1974.
Projection and 10,000-foot grid ticks: West Virginia coordinate
system, south zone (Lambert conformal conic).
1000-meter Universal Transverse Mercator grid ticks,
zone 17, shown in blue. 1927 North American datum.



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

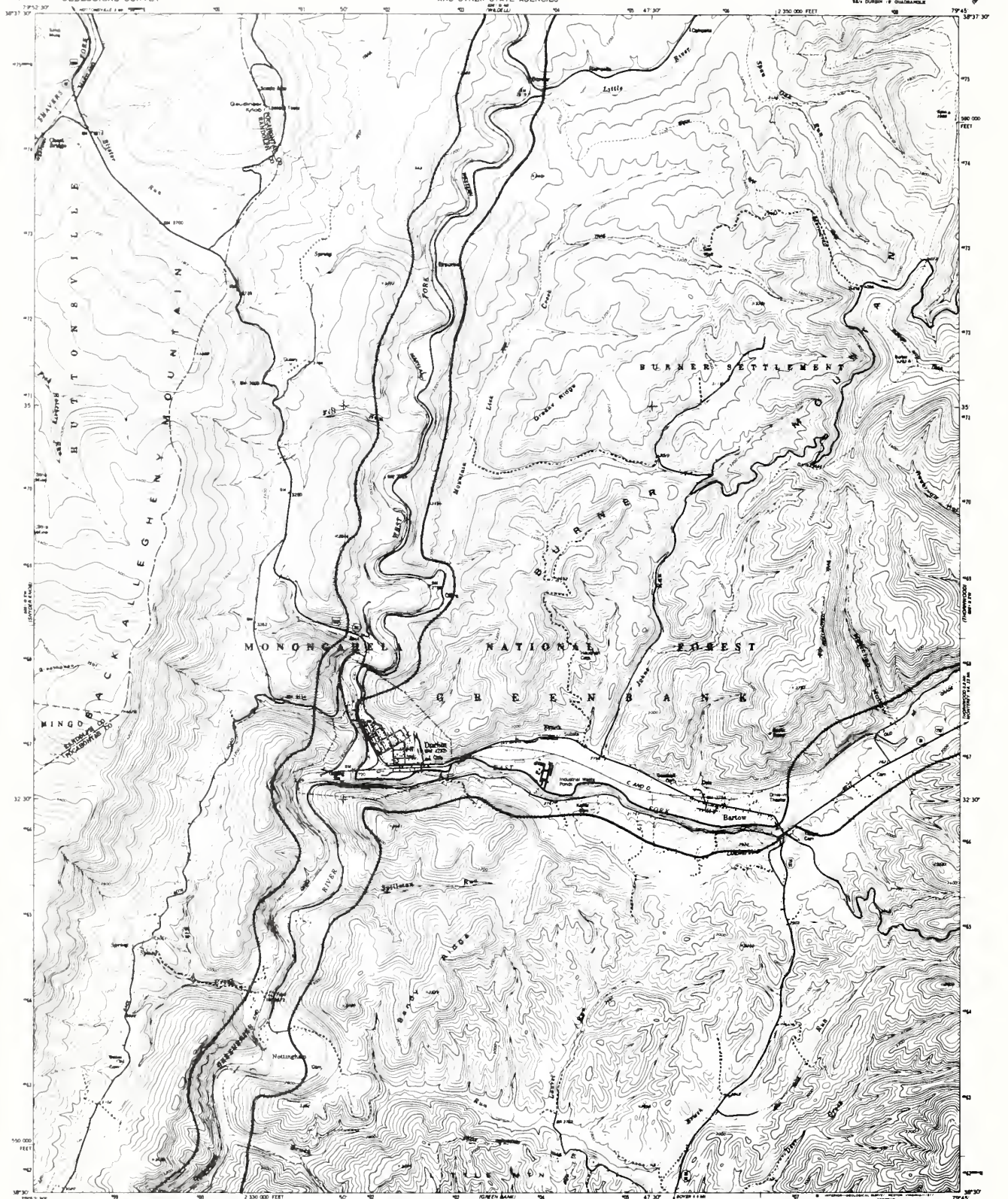


ROAD CLASSIFICATION
Primary highway ——— Light duty road, hard or
hard surface ——— unpaved surface
Secondary highway ——— hard surface
Unimproved road ———
Interstate Route ——— U.S. Route ——— State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY RESTON, VIRGINIA 20192
A POLAROID GROUNDWORK TOPOGRAPHIC MAPS AND THEMATIC IS AVAILABLE ON REQUEST

A31

WILDELL, W. VA.
6-14 DUBOIS 1:62,500
1977
GWS 304: 01-18, SERIES 1984



Mapped, edited, and published by the Geological Survey

Copies by USGS and NGS/NOAA

Topography by photogrammetric methods from aerial photographs

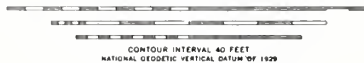
base 1973. Field checked 1974

Projection: west 10,000-foot grid ticks, West Virginia coordinate

system, south zone (Lambert conformal conic)

1:50,000-scale Universal Transverse Mercator grid ticks,

zone 17 shown in blue 1927 North American datum



ROAD CLASSIFICATION

Primary highway	Light duty road, hard or
hard surface	improved surface
Secondary highway,	Unimproved road
hard surface	
Interstate Route	U S Route
	State Route



THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY WESTON VIRGINIA 20009
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

A32

DURBIN W. VA.
NAD DURBIN - F QUADRANGLE
N3830-779457.5

1977

AMR 5061 B1 66-52123 1984

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

GREEN BANK QUADRANGLE
WEST VIRGINIA-POCAHONTAS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
HE-4 CASH 17 QUADRANGLE



Map of the Green Bank Quadrangle, West Virginia-Pocahontas Co. 7.5 Minute Series (Topographic). The map shows the Green Bank area, including the National Radio Astronomy Observatory, and the surrounding terrain with contour lines. The map is oriented with North at the top. The map includes a title block at the top, a legend at the bottom right, and a scale bar at the bottom center. The map is framed by a coordinate grid with latitude and longitude markings.

Map of the Green Bank Quadrangle, West Virginia-Pocahontas Co. 7.5 Minute Series (Topographic). The map shows the Green Bank area, including the National Radio Astronomy Observatory, and the surrounding terrain with contour lines. The map is oriented with North at the top. The map includes a title block at the top, a legend at the bottom right, and a scale bar at the bottom center. The map is framed by a coordinate grid with latitude and longitude markings.

Map of the Green Bank Quadrangle, West Virginia-Pocahontas Co. 7.5 Minute Series (Topographic). The map shows the Green Bank area, including the National Radio Astronomy Observatory, and the surrounding terrain with contour lines. The map is oriented with North at the top. The map includes a title block at the top, a legend at the bottom right, and a scale bar at the bottom center. The map is framed by a coordinate grid with latitude and longitude markings.

Map of the Green Bank Quadrangle, West Virginia-Pocahontas Co. 7.5 Minute Series (Topographic). The map shows the Green Bank area, including the National Radio Astronomy Observatory, and the surrounding terrain with contour lines. The map is oriented with North at the top. The map includes a title block at the top, a legend at the bottom right, and a scale bar at the bottom center. The map is framed by a coordinate grid with latitude and longitude markings.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

CASS QUADRANGLE
WEST VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
SCALE 1:62,500



Map compiled, edited, and published by the Geological Survey
Control by USGS and NGS/NOAA
Topography by photogrammetric methods from aerial photographs
taken 1973. Field checked 1974
Projection and 10,000-foot grid ticks: West Virginia coordinate
system, south zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid ticks
zone 11, chosen in 1967 North American datum



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

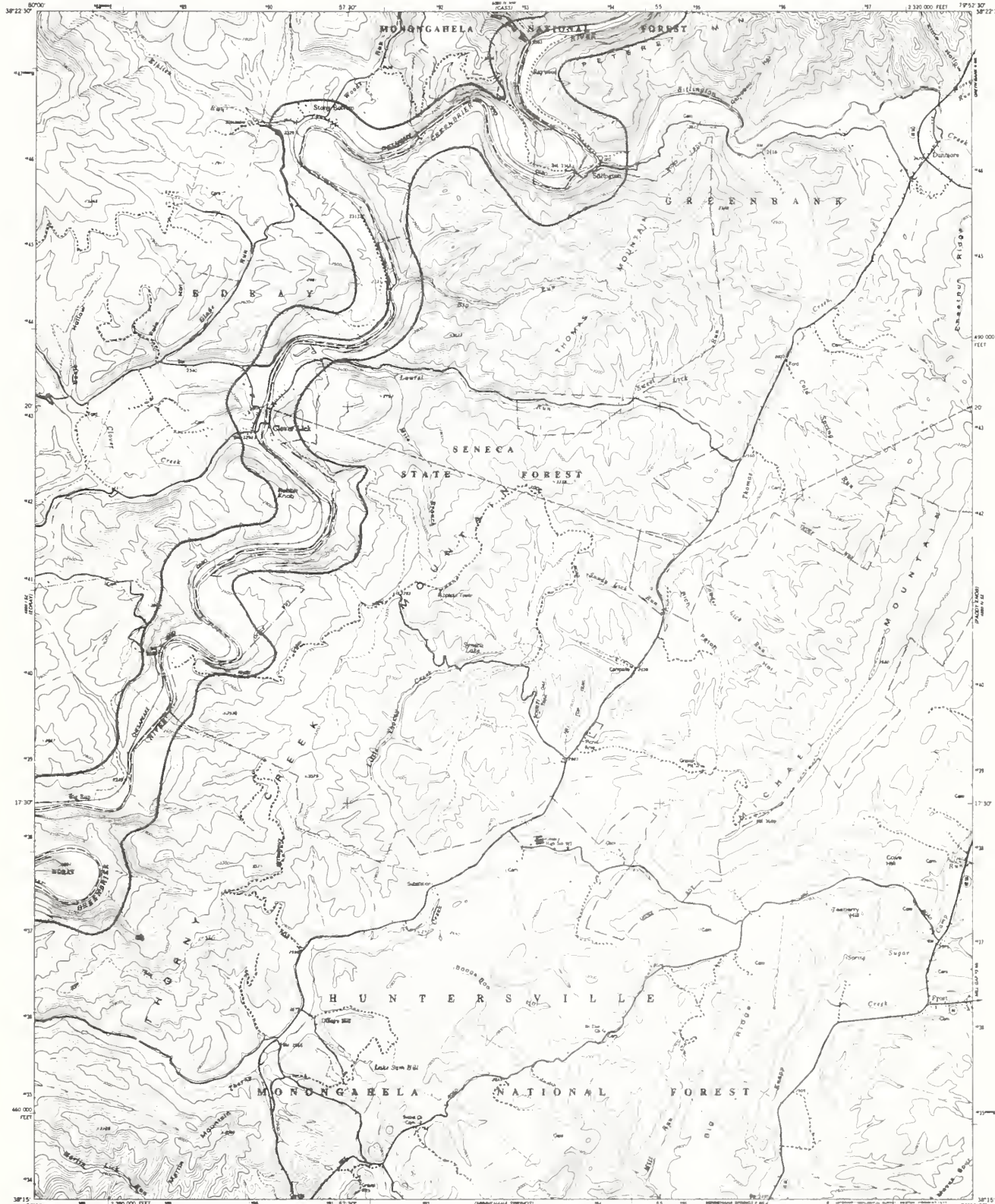


ROAD CLASSIFICATION
Primary highway: light duty road, hard or
hard surface
Secondary highway: unimproved surface
hard surface
Interstate Route U.S. Route State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY RESTON VIRGINIA 20192
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

A34

CASS, W. VA.
WEST VIRGINIA
1:62,500
1977
US 8080 IV 110-62500A 1984



Mapped, edited, and published by the Geological Survey
Control by USGS and NOAA
Topography by photogrammetric methods from aerial photographs
taken 1973. Field checked 1974
Projection and 10,000-foot grid (NAD 83) West Virginia coordinate
system, south zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid (NAD 83)
zone 17, shown in blue. 1927 North American datum
Fine red dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is uncharted.

1974 GRID AND 1974 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 20192
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



ROAD CLASSIFICATION
Primary highway: hard surface, light-duty road, hard or improved surface
Secondary highway: hard surface, unpaved road
Interstate Route: U.S. Route, State Route

CLOVER LICK, W. VA.
1:62,500 SCALE (1:62,500)
7.5 MINUTE SERIES (TOPOGRAPHIC)

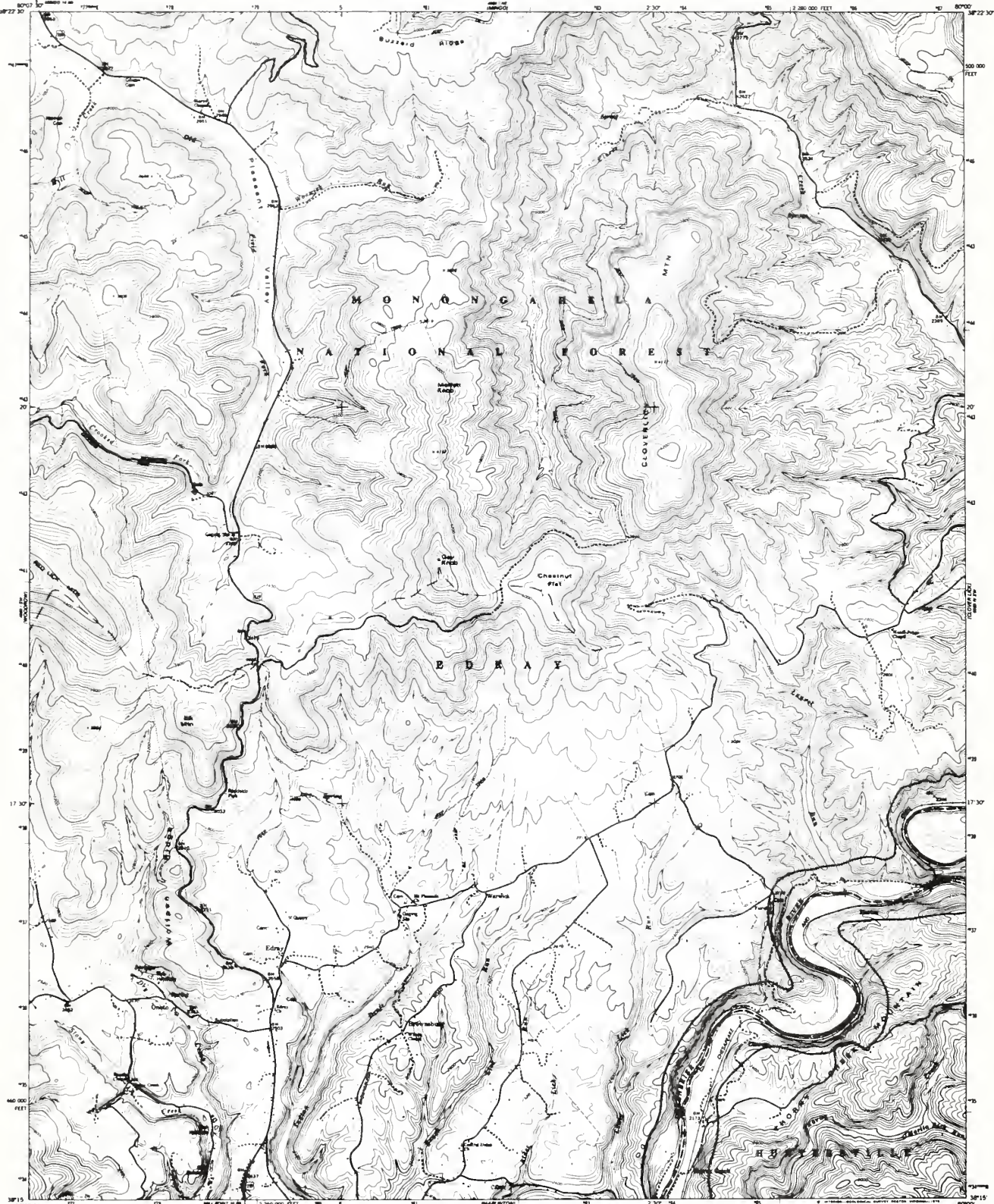
A35

1977
ART 5000-11 69-SERIES 1964

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

EDRAY QUADRANGLE
WEST VIRGINIA—POCAHONTAS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
U.S. GEOLOGICAL SURVEY



Map compiled, edited, and published by the Geological Survey
Control by USGS and NOAA
Topography by photogrammetric methods from aerial photographs
taken 1973. Field checked 1974.
Projection and 10,000-foot grid ticks. West Virginia coordinate
system, south zone (Clarke's continental cone).
1000-meter Universal Transverse Mercator grid ticks,
zone 17, shown in blue. 1927 North American datum.
Fine red dashed lines indicate selected fences and field lines shown
generally visible on aerial photographs. This information is unclassified.



CONTOUR INTERVAL 40 FEET
NATIONAL GEOGRAPHIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION
Primary highway, hard surface ————
Secondary highway, hard surface ————
Unimproved road ————
Interstate Route ————
U.S. Route ————
State Route ————

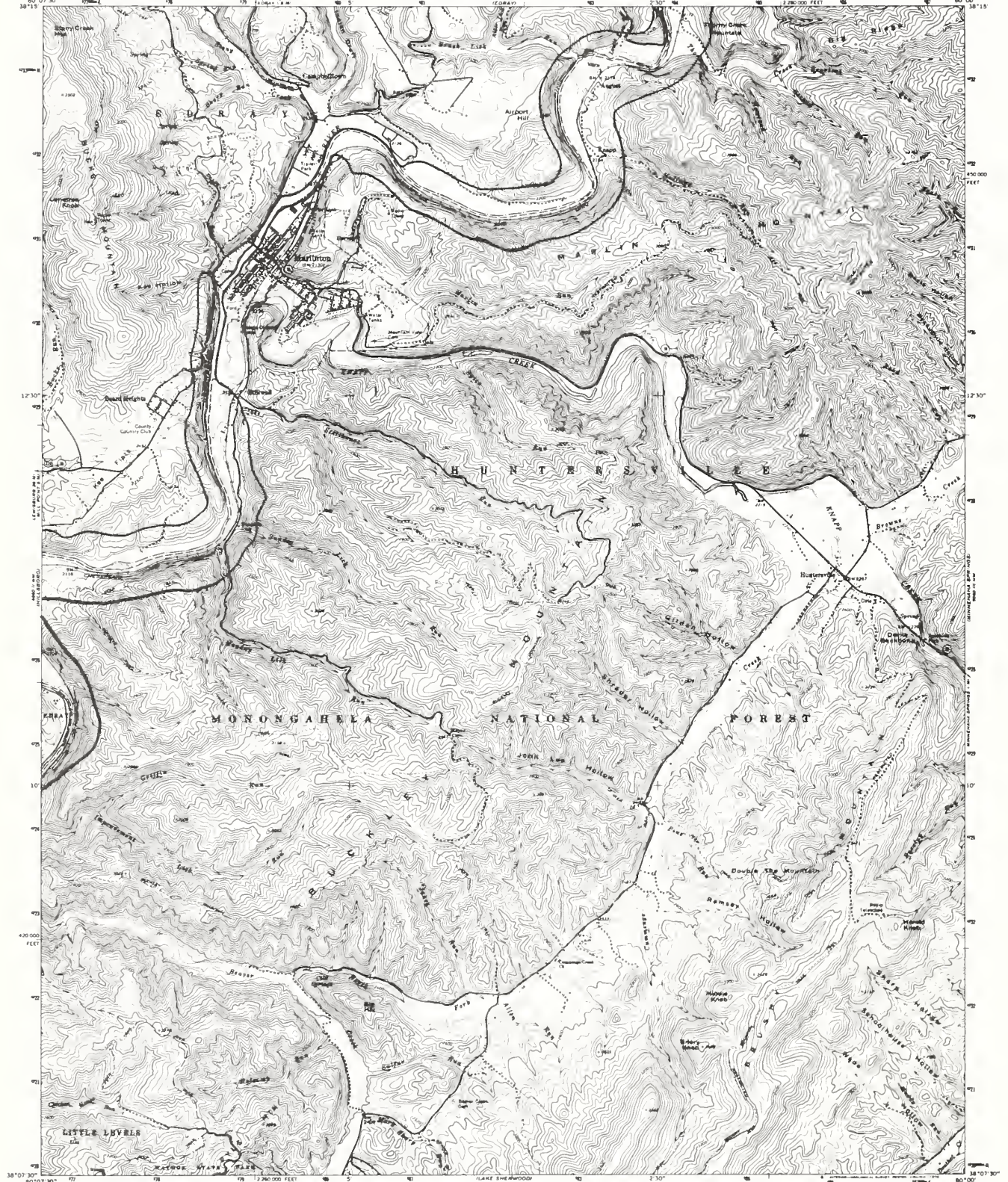


THIS MAP COMPLES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY RESTON, VIRGINIA 22092
* FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

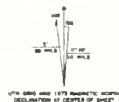
A36

EDRAY, W. VA.
FIELD CHECKED BY QUADRANGLE
A3615—WED007.5
1977

U.S. GEOLOGICAL SURVEY



Mapped, edited, and published by the Geological Survey
Control by USGS and NGS/NOAA
Topography by photogrammetric methods from aerial photographs
taken 1973. Field checked 1973.
Projection and 10,000-foot grid ticks. West Virginia's coordinate
system, south zone (Lambert conformal conic).
1000-meter Universal Transverse Mercator grid ticks,
zone 17. Shown in blue. 1927 North American datum.



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



ROAD CLASSIFICATION
Primary highway —————
Hard surface —————
Secondary highway —————
Unimproved road —————
Interstate Route ———— U.S. Route ———— State Route ————

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY WEST VIRGINIA 2002
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

A37

MARLINTON, W. VA.
REL. MARLINTON 15 QUADRANGLE
H3807.5—W8000/7.5
1977
A38-4880 115E-SERIES 1984

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

HILLSBORO QUADRANGLE
WEST VIRGINIA-POCAHONTAS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
1:250,000



Maped, edited, and published by the Geological Survey
Control by USGS and HOS/NOAA
Topography by photogrammetric methods from aerial photography
taken 1973. Field checked 1973.
Projection and 10,000-foot grid ticks. West Virginia coordinate
system. South zone (Lambert conformal cone).
1:250,000. Universal Transverse Mercator zone 17, tick
zone 17, shown in blue. 1927 North American datum.



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



ROAD CLASSIFICATION
Primary highway: solid line
Light-duty road: hard or
hard surface: dashed line
Secondary highway: dotted line
Unimproved road: dashed line
Interstate Route: circle with number
U.S. Route: square with number
State Route: circle with number

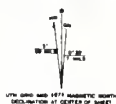
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A PUBLISHED TOPOGRAPHIC MAP AND SYMBOLS IS AVAILABLE ON REQUEST

A38

HILLSBORO, W. VA.
1:250,000
N 3807.5-W 87.7.5
1977
AMS 4880 II IV-SERIES 1984



Mapped, edited, and published by the Geological Survey
Control by USGS and NCIS/NOAA
Troughs by photogrammetric methods from aerial photographs
taken 1973. Field check had 1973
Projection and 10,000 foot grid ticks. West Virginia coordinate
system, south zone (Lambert) conformal, conical
1000 meter Universal Transverse Mercator grid ticks,
zone 17, shown on sheet. 1927 North American datum.
Fine red dashed lines indicate lateral fence and red lines where
generally visible on aerial photographs. This information is unclassified



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

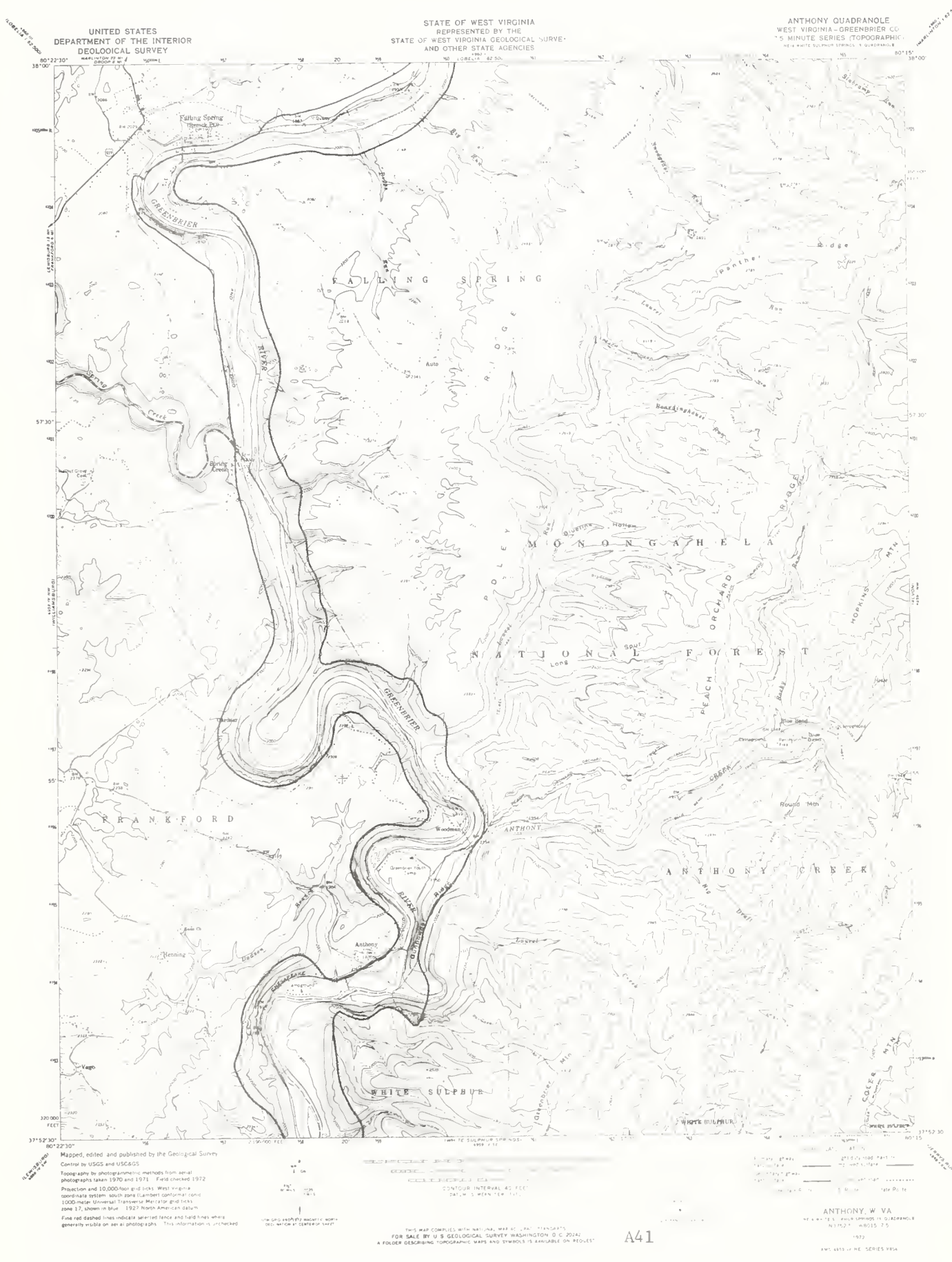
ROAD CLASSIFICATION
Primary highway ——— Light duty road hard or
hard surface ——— improved surface
Secondary highway ——— Unimproved road
Interstate Route ——— U.S. Route ——— State Route



THIS MAP COMPLES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY RESTON VIRGINIA 22092
+ FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

A40

DROOP, W. VA.
82-4 LORLEIA 1 QUADRANGLE
N3800-W3015/7.5
1977
AMS 480 111 BE-SERIES V854



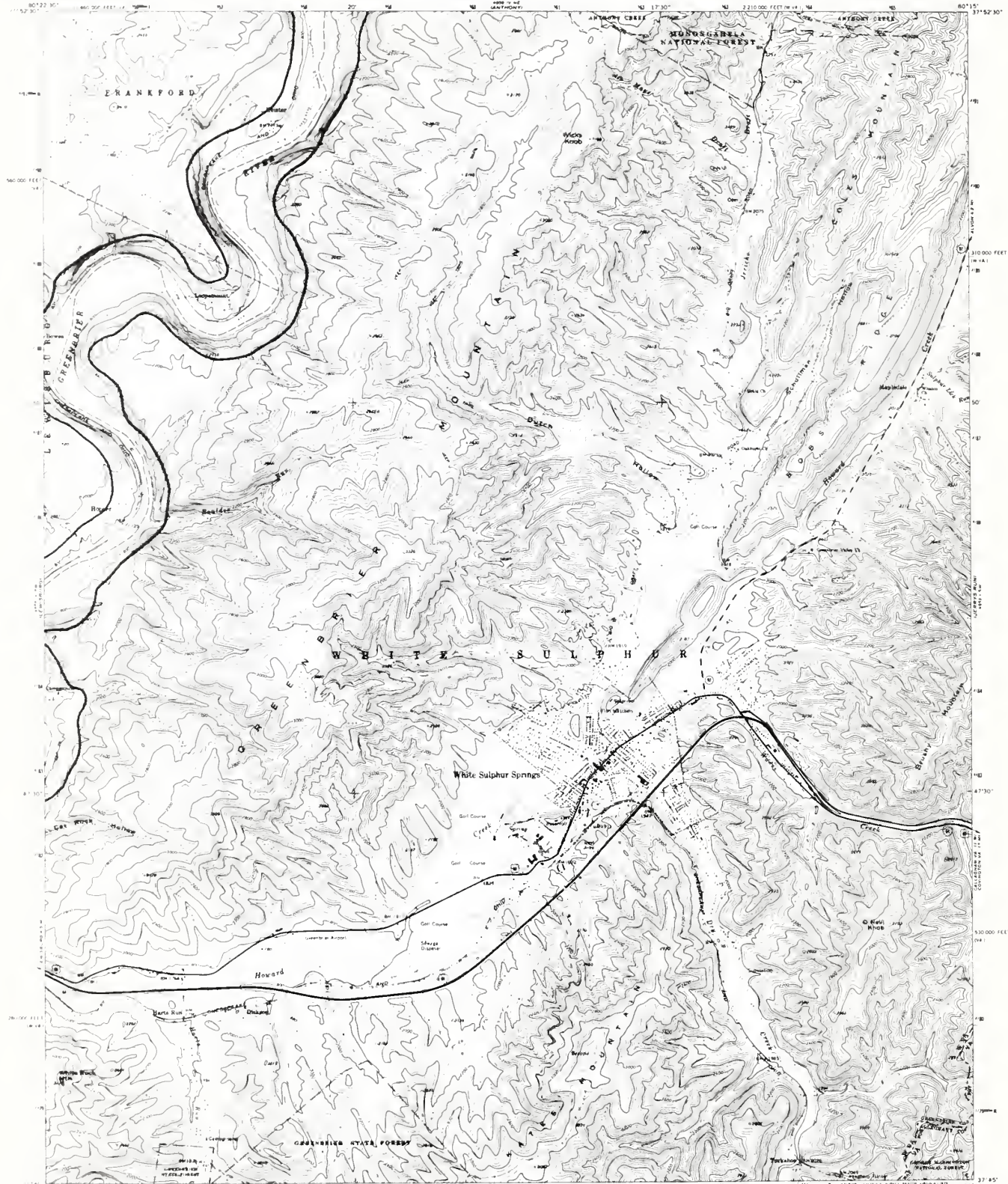
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

ANTHONY QUADRANGLE
WEST VIRGINIA-GREENBRIER CO.
15 MINUTE SERIES TOPOGRAPHIC
MAP OF THE STATE OF WEST VIRGINIA

Map compiled, edited, and published by the Geological Survey
Control by USGS and USACGS
Topography by photogrammetric methods from aerial
photographs taken 1970 and 1971. Field checked 1972
Projection and 10,000-foot grid (East West Virginia
coordinate system, South zone Lambert conformal conic
1000-meter Universal Transverse Mercator grid ticks
zone 17, shown in blue, 1929 North American datum)
Fine red dashed lines indicate surveyed fence and field lines where
generally visible on aerial photographs. This information is unchecked

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Map edited and published by the Geological Survey
Control by USGS and USACGS
Topography by photogrammetry methods from aerial
photographs taken 1970 and 1971. Field checked 1972
Projection: West Virginia coordinate system, south zone
(Lambert conformal conic)
10,000 foot grid based on West Virginia coordinate system
south zone and Virginia coordinate system, south zone
1000 meters. Universal Transverse Mercator grid ticks
zone 17 shown in blue. 1927 North American datum

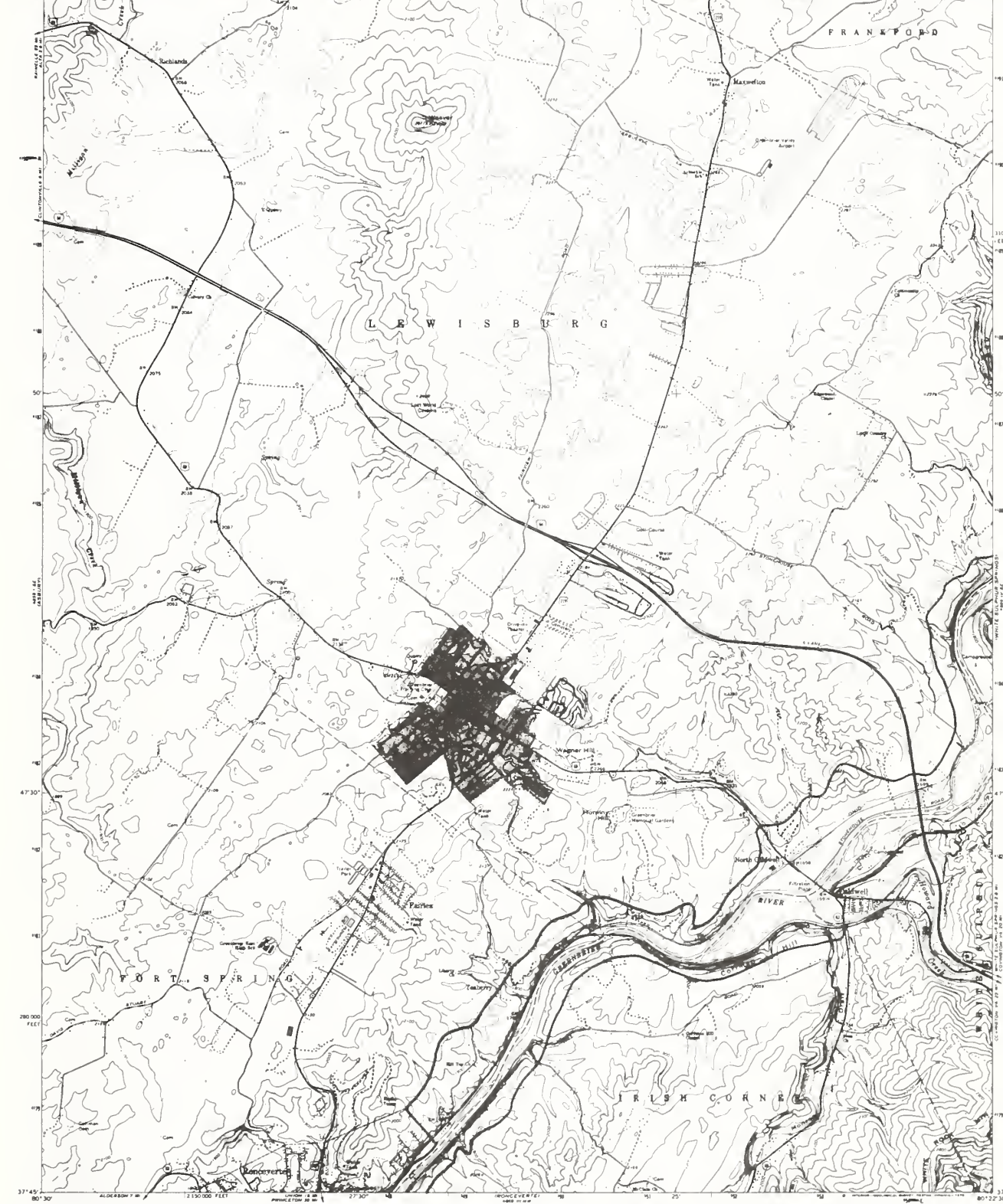


ROAD CLASSIFICATION
Primary highway: hard surface, light duty road, hard or improved surface
Secondary highway: hard surface, unimproved road
Interstate Route, U.S. Route, State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY RESTON VIRGINIA 22092
AND VIRGINIA DIVISION OF MINERAL RESOURCES CHARLOTTEVILLE VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

A42

WHITE SULPHUR SPRINGS, W. VA. - VA.
SE-1 WHITE SULPHUR SPRINGS 15 QUADRANGLE
N3745-W8015-175
1972
8MS 4555 IV SE-SERIES V954



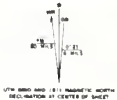
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

RONCEVERTE QUADRANGLE
WEST VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW 4 RONCEVERTE 15 QUADRANGLE
2 160 000 FEET



Mapped, edited, and published by the Geological Survey
Control by USGS and USCGS
Tracing by photogrammetric methods from aerial
photographs taken 1971. Field checked 1971.
Projection and 10 000 foot grid ticks. West Virginia coordinate
system, south zone (Lambert's coniform, conic)
1000 meter Universal Transverse Mercator grid ticks,
zone 17 shown in blue. 1927 North American datum.
Fine red dashed lines indicate waterway fence and field lines where
generally visible on aerial photographs. This information is uncharted.



THIS MAP COMPLEYS WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY REGIONAL OFFICES
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



ROAD CLASSIFICATION
Primary highway ——— Light duty road, hard or
hard surface ——— improved surface
Secondary highway ———
hard surface ———
Unimproved road ———
Interstate Route ——— U.S. Route ——— State Route

RONCEVERTE, W. VA.
NW 4 RONCEVERTE 15 QUADRANGLE
N3737 5-WB022 5/7 5
1971

AMS 495 III: NW-SERIES 1984

A44

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

ASBURY QUADRANGLE
WEST VIRGINIA—GREENBRIER CO.
1:50,000 SERIES (TOPOGRAPHIC)
SEA CLUTONVILLE 15 QUADRANGLE



Map prepared and published by the Geological Survey
Controlled by USGS and USACGS
Topography by photogrammetric methods from aerial
photographs taken 1971. Field checked 1972
Projection and 10,000-foot grid lines. West Virginia coordinate
system, south zone (Lambert conformal conic)
1000 meter Universal Transverse Mercator grid lines,
zone 17 shown in blue. 1927 North American datum.
Fine red dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is uncheckered.

UTM and UTM (MERCATOR) COORDINATE
DECLINATION AT CENTER OF SHEET



ROAD CLASSIFICATION
Primary highway
Secondary highway
Interstate Route
Light-duty road
Improved surface
Unimproved road
State Route

THIS MAP COMPLETES NATIONAL MAP ACCURACY STANDARD
FOR SALE BY U.S. GEOLOGICAL SURVEY RESTON VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

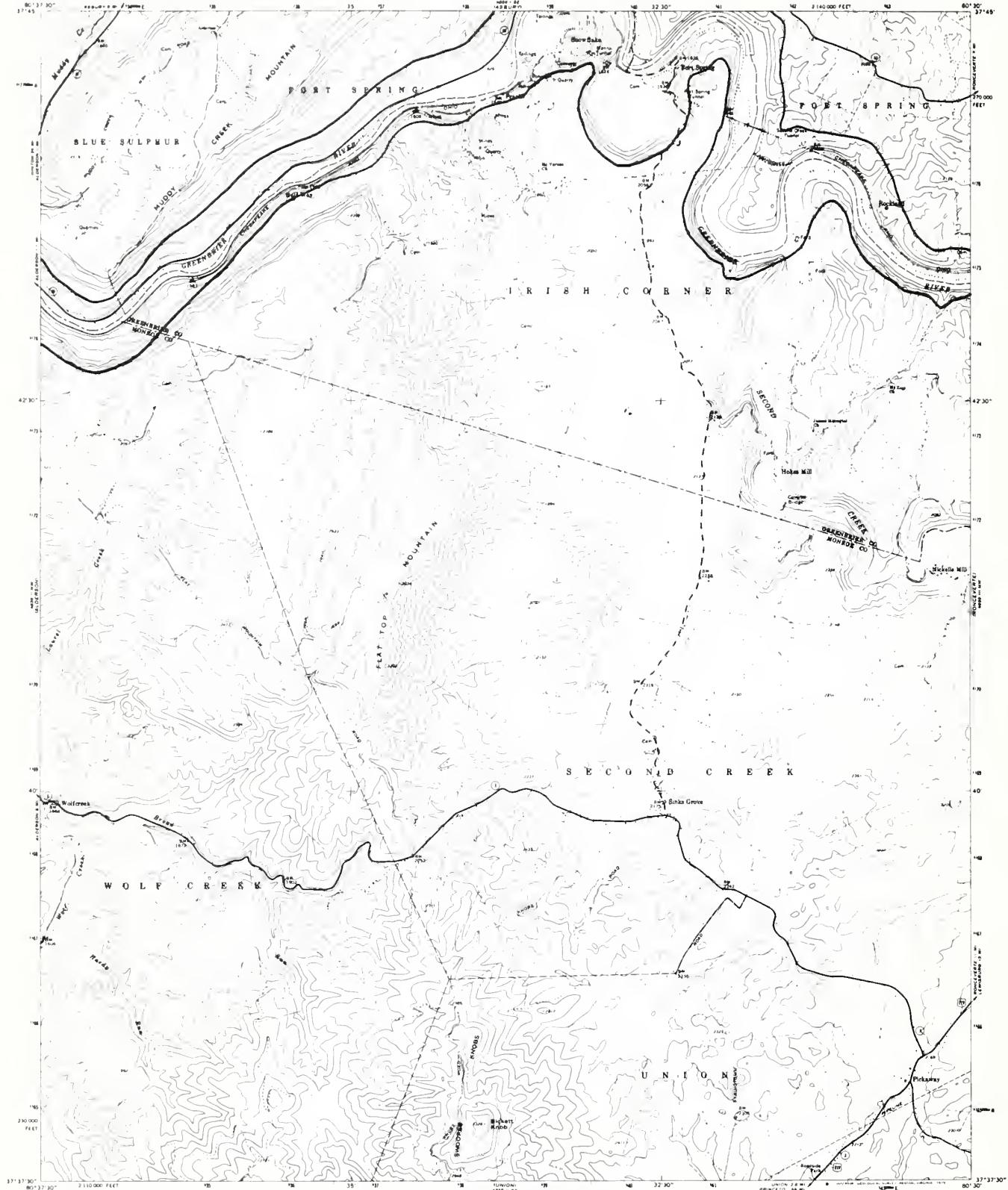
A45

ASBURY W. VA.
SEA CLUTONVILLE 15 QUADRANGLE
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AMS 1001 / 1002 SERIES 1945

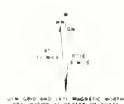
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

FORT SPRING QUADRANGLE
WEST VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
HEXAGONAL 15 QUADRANGLE



Maped, edited and published by the Geological Survey
Control by USGS and USFAGS
Topography by photogrammetric methods from aerial
photographs taken 1965, 1970 and 1971. Field checked 1971
Projection and 10 000-foot grid ticks, West Virginia coordinate
system, south zone (Lambert conformal conic)
1000 meter Universal Transverse Mercator grid ticks,
zone 17 shown in blue. 1927 North American datum.
Fine red dashed lines indicate section fences and field lines where
generally visible on aerial photographs. This information is uncheckered.



CONTOUR INTERVAL: 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION
Primary highway
Light-duty road, hard or
improved surface
Secondary highway
hard surface
Unimproved road
Interstate Route
U. S. Route
State Route



THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WEST VIRGINIA 22062
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

FORT SPRING, W. VA.
HEXAGONAL 15 QUADRANGLE
N3737 5-W8030/7.5
1971
AND 4058 II HE-SERIES 7804

A46

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
STATE OF WEST VIRGINIA GEOLOGICAL SURVEY
AND OTHER STATE AGENCIES

ALDERSON QUADRANGLE
WEST VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
WITH ALDERSON IN QUADRANGLE



Maped, edited, and published by the Geological Survey
Control by USGS and USC&GS

Topography by photogrammetric methods from aerial
photographs taken 1965. F and checked 1971.
Projection and 30 000-foot grid ticks. West Virginia coordinate
system: south zone (Lambert conformal conic).
1000-meter Universal Transverse Mercator grid ticks,
zone 17, shown in blue. 1927 North American datum.
Elevations shown in purple compiled from aerial photographs
taken 1976. This information not field checked.

UTM GRID AND 15th MAGNETIC NORTH
DECLINATION AT 1975.000

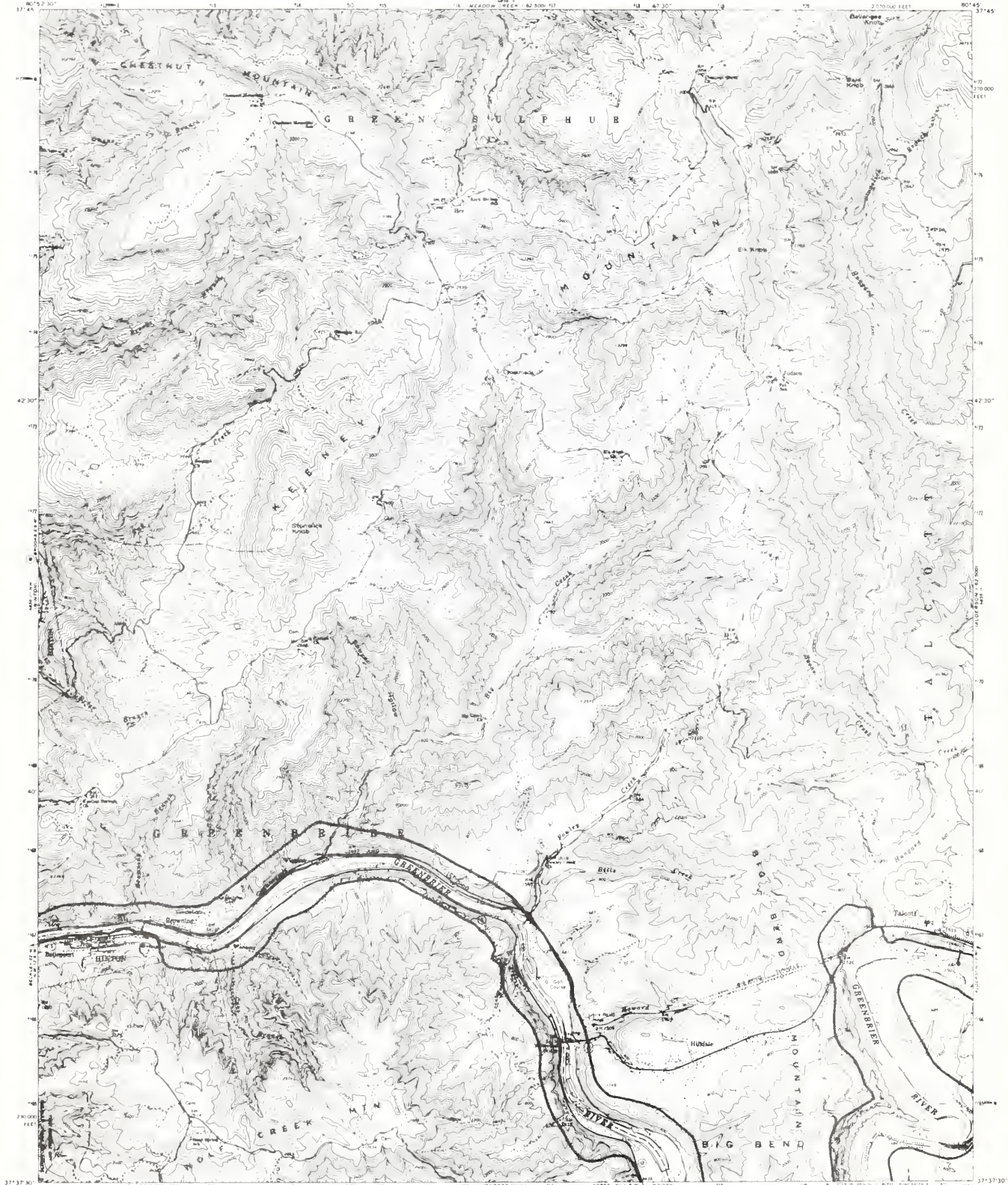
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLEYS WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY WEST VIRGINIA 22092
A POLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION
Primary highway: Light-duty road, paved or
Secondary highway: Improved surface
Unimproved road: Unimproved road
Interstate Route: U.S. Route: State Route

ALDERSON, W. VA.
7.5 MINUTE SERIES (TOPOGRAPHIC)
N3737 5—W8037 5/7 5
1973
PHOTOREVIEWED 1976
AND MAP II IN THE SERIES 1976

A47



Maped, edited and published by the Geological Survey

Control by USGS and USGS 8.5

Topog. data by photogrammetric methods from aerial
photos taken 1967. Contour checked 1968

Projection: 1927 North American Datum
10,000 foot grid based on West Virginia coordinate system
North zone
1,000 meter Universal Transverse Mercator grid
zone 17 shown in blue

1:75,000 (2:50,000) SCALE, NORTH
1:75,000 (2:50,000) SCALE, NORTH



CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

Primary highway all weather Light duty road all weather
hard surface Improved surface
Secondary highway all weather Unimproved road fair or dry
weather
State Route

QUADRANGLE LOCATION

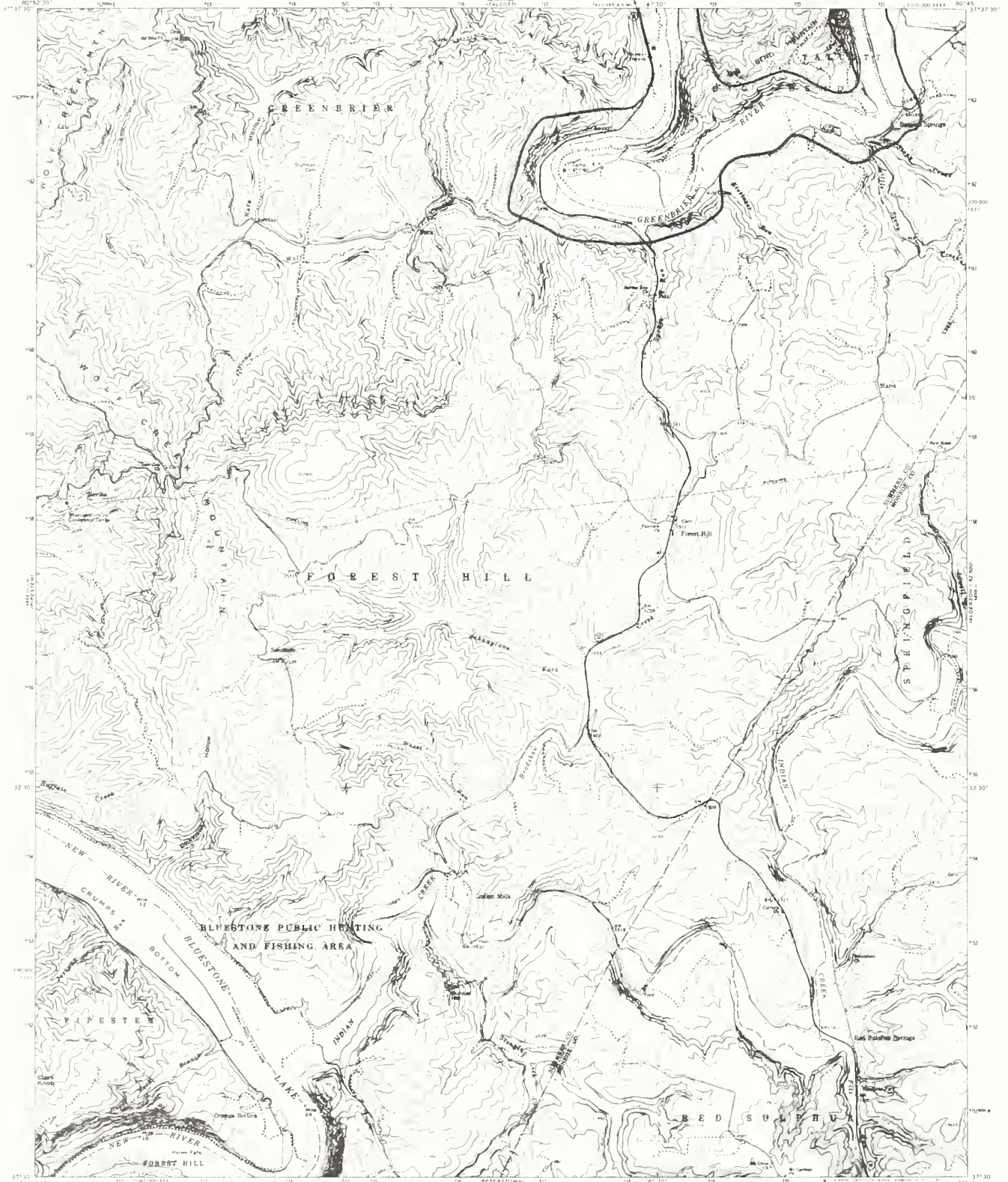
A48

TALCOTT, W. VA.
NE 1/4 BIG BEND 15 QUADRANGLE
N2737 5 - W8045 7 5

1968

AMS 485-111 NE-SERIES 1984

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20542
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



Map compiled and published by the Geological Survey
Controlled by USGS and NC&S
Topography by photogrammetric methods from aerial photographs
taken 1967 Field checked 1968
By contour interval 1967 North arrow 1967
1:75,000 horizontal scale based on mean spheroidal earth system
vertical scale 1000 meters on vertical Transverse Mercator grid lines zone 17
shown in blue
Faint dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is uncharted
Areas covered by dashed light blue pattern are subject to conditions

1
VIEW GRID MAP HAS MAGNETIC NORTH
160° NORTH IN 1967

THIS MAP COMPLETES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY WASHINGTON D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Quadrangle location

Plunging spray all weather
Hard surface
Important road
Weather

State Route

FOREST HILL W VA
SEA-NO BOUNDARY QUADRANGLE
N1730-W1045-7.5
1968
AMS 4855 III SE-SERIES 1954



Maped, edited, and published by the Geological Survey
Control by USGS and USGAS
Topography by photogrammetric methods from aerial
photographs taken 1967. Field checked 1968
Photometric projection: 1927 North American datum
10 000 foot grid based on West Virginia coordinate system
South zone
1000 meter Universal Transverse Mercator grid ticks
zone 17 shown in blue
Faint dashed lines indicate selected fence and road lines where
generally visible on aerial photographs. This information is uncharted
Red tint indicates area in which only landmark buildings are shown
Areas covered by dashed light blue pattern
are subject to controlled inundation

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY WEST VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in purple compiled from aerial photographs
taken 1976. This information not field checked

A50

ROAD CLASSIFICATION
Primary highway all weather
Secondary highway all weather
Unimproved road fair or dry
weather
State Route

HINTON, W. VA.
NAD 83 BOUNDARY QUADRANGLE
7.5 MINUTE SERIES
1968
PHOTO REVISITED 1976
AND 1978 IN NW SERIES 954



R0000 450475



R0000 450475